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ABSTRACT

This report describes a two-year project designed (1) to develop collections of measurable instructional objectives and related assessment procedures, (2) to devise methods for improving quality control of such materials, and (3) to consider alternative schemes for categorizing these objectives and related measures. As a consequence of the project, 28 separate collections of instructional objectives and related test measures were produced, in all, over 2,000 objectives and more than 7,000 test items to measure these objectives. During the period of the project's existence, well over 30,000 separate collections had been distributed to American educators. Regarding quality control, both reviewer-based and "selection-assistance" strategies were used during the project to improve the quality of objectives. In particular, the situation-assistance strategy involving ratings of extant objectives by various clienteles, e.g., students, parents, and teachers, was extensively field tested. For test items, both a priori and a posteriori procedures were employed with certain advantages noted for each. An extensive analysis of competing classification schemes failed to yield any markedly innovative category systems which appeared particularly useful. Nonetheless, recommendations were reached for revised classifications of objectives in the various collections, chiefly on the basis of more limited numbers of content general objectives. (Author)

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W. James Popham
University of California, Los Angeles
Los Angeles, California 90024

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September, 1971

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TABLE OF CONTENTS

		PAGE
Author's Abstract		i
List of Tables		iv
List of Figures		vi
Chapter 1:	Project Overview	1
Chapter 2:	A Rationale for Objectives-Bank Operations	8
Chapter 3:	Development Activities	13
Chapter 4:	Twenty-eight Objectives Collections: Description and Dissemination	43
Chapter 5:	Quality Control Activities	55
Chapter 6:	Classification Activities	107
Appendix A:	Objective Rating Survey Form Used in the January, 1971 Field Trial	129
Appendix B:	Quality Control Survey Procedure	134
Appendix C:	Reading Objectives: Study Skills -- Lower Elementary	172
Appendix D:	Reading Objectives: Study Skills -- Lower Elementary -- With Sample Test Item	184
Appendix E:	Position Statement Regarding the Classroom Teacher Support System	188

TABLES

TABLE		PAGE
1	Questionnaires returned to IOX during 1969	16
2	Orders Received as of January 1, 1970	17
3	Mean Preference Ratings for Specific Objectives Versus Very Specific Behavioral Objectives of 221 Minnesota Educators and 151 California Educators	22
4	A Hypothetical Comparison of Preference and Performance Data	61
5	Ranked Mean Ratings of Nineteen History Objectives by Students, Teachers, Parents, and Futurists	64
6	Rank Order Intercorrelations Among Objectives Rankings by Students, Teachers, Parents, and Futurists	65
7	Ranked Mean Ratings of 30 Study Skills Objectives by Parents and Teachers (K-3 Grade Levels)	69
8	Rank Order Intercorrelations Among Objectives by Parents and Teachers (K-3 Grade Levels)	72
9	Ranked Mean Ratings of Fifty-two Study Skills Objectives by Students, Teachers, and Parents (4-12 Grade Levels)	73
10	Rank Order Intercorrelations Among Objectives by Students, Parents, and Teachers (4-6 Grade Levels)	79
11	Ranked Mean Ratings of Twenty-five Study Skills Objectives by Students, Parents, and Teachers (7-12 Grade Levels)	80
12	Rank Order Intercorrelations Among Objectives by Students, Parents, and Teachers (7-12 Grade Levels)	83
13	Rank Order Correlations Among Objectives With and Without Sample Test Items by Students, Parents, and Teachers	84
14	Frequency Distribution of Correct (1) and Incorrect (0) Responses for Pretest-Posttest Performance of 100 Subjects Based on the SWRL Instructional Concepts Program	99

TABLES (Cont.)

TABLE		PAGE
15	Correlations Between Cox-Vargas' Difference Index and Pretest-Posttest Difference Index for 100 Subjects' Performance on Four Ten-Item Instructional Methodology Subtests.	101
16	Frequency Distribution of Correct (1) and Incorrect (0) Responses for Pretest-Posttest Performance of 100 Subjects on Four Subtests Based on a UCLA Instructional Methodology Course	102
17	Correlations Between Rankings Based on 01 and 10 Frequencies for the Instructional Methodology Class Test Results	104
18	Chi Square Values Yielded by Contrasting Fourfold Frequencies of Each Item with Hypothetical Frequencies Based on the Median Value of Each Ten-Item Subtest	105
19	Content General Objectives -- Decoding Skills	118

FIGURES

FIGURE		PAGE
1	Project Decision Model	32
2	A Fourfold Table Representing Possible Pretest-Posttest Performance on Test Items	98

CHAPTER ONE

PROJECT OVERVIEW

This report describes a two-year project, supported by the United States Office of Education, which was designed to develop sets of measurable instructional objectives and related assessment devices for use by American educators. The project was initiated at a time when, although there was widespread advocacy of the proposition that educators should employ measurable objectives in their instruction and evaluation efforts, few comprehensive collections of such objectives were available. The project was closely coordinated with the activities of the Instructional Objectives Exchange, a project initiated by the UCLA Center for the Study of Evaluation to serve as a developer and disseminator of objectives and related test measures. By increasing the magnitude of objectives available to educators through such agencies as the Instructional Objectives Exchange, this project was designed to facilitate the efforts of those school people who wish to design instruction and assess the quality of their designs in terms of measurable learner outcomes.

The impetus for the project occurred in early 1969 when the principal investigator was contacted by Office of Education officials to explore the possibility of undertaking a project to develop collections of objectives and related test measures from which educators might select, particularly such educators as those associated with the network of schools (ES '70) which USOE was at that time fostering. Administrators of this group of schools, and they appeared representative of a number of such innovatively inclined educators, were essentially pleading for the creation of well organized pools of instructional objectives and measures from which their staffs could choose, rather than being obliged to construct such objectives and measures themselves. The principal investigator participated in a meeting in Washington, D.C., where representatives of a number of these schools met with USOE officials to indicate the nature of their plans with respect to the evaluation of their innovative efforts. When the necessity for measurable instructional objectives arose in connection with their evaluation activities, these representatives were interested in learning of the establishment of the Instructional Objectives Exchange (IOX) which only a few months earlier had commenced operation at UCLA. A description of the objectives then being generated within IOX revealed, however, that most of the materials were aimed at the elementary grades whereas this particular group of innovative schools was concerned almost exclusively with education at the secondary level. Accordingly, they urged that additional support be given to the Objectives Exchange to hasten its expanded development of objectives and measures at the secondary level and, at least for the ES '70 schools, in vocational fields.

Accordingly, after additional discussions with Office of Education officials, a proposal to support a two-year developmental effort was submitted to the Office of Education in April, 1969, and the project was approved several months thereafter, commencing formal operation on July 1, 1969.

While its overall goal was to increase the number of objectives and measures available to American school people, there were to be three specific purposes of the project. Because these three purposes served both as the focus of project activities, as well as the outline for the remainder of this report, they will be briefly identified at this point.

Purpose Number 1. The initial purpose of the project was to increase the magnitude of available objectives and measures available to American educators. While it was anticipated at the time the grant was awarded that these materials would be distributed through the Instructional Objectives Exchange, their availability in the public domain would also permit them to be distributed through other comparable item bank agencies.

Purpose Number 2. The second purpose of the project was to exercise improved quality control over acquired and developed objectives. Both with respect to extant objectives which were located by the project staff as well as those which were developed by the staff, it was considered particularly important to impose high quality standards on the materials. Projects such as this can, of course, produce an immense quantity of materials which is of such poor quality that the materials will never be worth using. The second purpose of the project was to improve the quality of the objectives and measures developed and, at the same time, to study the procedures whereby such quality control standards could be implemented.

Purpose Number 3. The third purpose of the project was to consider alternative classification schemes which might be employed to both develop and retrieve instructional objectives so that they could be more readily employed by educators. Specifically, an effort was to be undertaken to consider categorization schemes other than those involving the commonly employed grade level and subject rubrics.

It should be clear from an examination of the above three purposes that this project can be more accurately described as a development effort rather than a classic research effort. The enterprise was designed to produce sets of high quality materials which would serve as useful resource for American school people. There were no focal hypotheses to be tested, no elaborate statistical analyses of resulting data. Rather, the project represented an intense effort to produce materials deemed necessary for certain educational activities. While the tools of the conventional educational researcher

were employed sporadically to test the viability of procedural variants for certain developmental activities, the thrust of the enterprise was clearly developmental. Thus a development paradigm rather than a standard research model was employed.

Organization of the Report

This final report is organized around six major chapters, the first of which is designed to provide an overview of the entire project. In the current section, for example, identification of the remaining chapters will be presented. Following the identification of these chapters, a brief historical account of the project's relationship with the UCLA Center for the Study of Evaluation will be given as well as its interaction with the Instructional Objectives Exchange when that agency became separated from the Center. The current chapter will be concluded with an introductory examination of the three separate purposes of the project and will offer what is, in essence, a preview of the remaining five chapters of the report.

The five chapters to follow the current Overview Chapter are the following: Chapter Two presents a rationale for the establishment of objectives bank operations comparable to the Instructional Objectives Exchange. Since the goal of the current project was to prepare materials which might be employed by such agencies, it was considered desirable to depict why such agencies may be needed. Chapter Three describes the early, middle, and later developmental activities conducted within the project and attempts to detail an increasingly self-conscious developmental enterprise. Chapter Four describes the principal product of the project, namely, the collections of instructional objectives and test measures produced during its operation. In that chapter collection, titles, number of objectives, number of test items, and general content for each objective collection will be presented along with information regarding dissemination of materials to date. Chapter Five treats the quality control activities associated with the project, offering a general description of the varied techniques which were employed to assure high quality of the objectives and related test measures. Chapter Six deals with the activities regarding the classification of objectives and will present recommendations resulting from two years' consideration of the types of classification systems which might prove optimally useful to educators.

Project's Relationship with CSE and IOX

It was noted earlier that the current project was initiated at a time when the Instructional Objectives Exchange had been recently created as a project within the UCLA Center for the Study of Evaluation (CSE). In all of the language of the

original grant proposal, the nature of this anticipated relationship was clearly spelled out. Specifically, there would be a collaboration effort involving resources of the Center for the Study of Evaluation and the new project staff. Indeed, this was precisely what occurred, for upon notification that the grant had been approved, personnel from CSE and the current project worked in close cooperation for the entire first year of the project's existence. Several key CSE supervisory personnel cooperated with the project's principal investigator to coordinate our work force, most of whom were housed within office space provided by CSE. By capitalizing on certain equipment and support facilities of CSE, it is clear the project was able to accomplish more during this first year of operation than would have been the case without CSE interaction. At the same time, however, information being derived from the project was being used by a more comprehensive research effort of the Center, the Project for Research on Objective Based Evaluation, which was directed by a guiding committee constituted by a number of UCLA faculty including the principal investigator of the current project. In other words, the symbiotic relationship between the project and CSE was deemed exemplary. In many ways, it was unfortunate that this relationship could not continue during the second year of the project's existence.

With the approach of the second year, however, USOE officials guiding the operations of the Center for the Study of Evaluation had indicated their desire to CSE leaders that the Instructional Objectives Exchange project be separated from the Center. It was the view of these USOE officials that the IOX represent a <u>service</u> rather than a research and development operation and, therefore, should more appropriately function as an agency separate from the research and development oriented center. As a consequence, in June of 1970 the Instructional Objectives Exchange was established as a separate non-profit corporation in the State of California and moved to quarters some distance from the University. Because office space was at a premium, the current project was obliged to move from the Center and, more decisively, from the campus as well. An off-campus suite of offices located near the University served as the base of operations for the project during its remaining year. During that period, however, reasonably close relationships were maintained between a number of key staff within the Center for the Study of Evaluation and the Instructional Objectives Exchange, for it was still anticipated that the Instructional Objectives Exchange would serve as a primary outlet for materials being developed by the project. Although all such materials were destined for the public domain, where they could be used by any objectives bank agency wishing to utilize them, it was assumed likely that the Instructional Objectives Exchange would be one such agency distributing the materials.

Purpose Number 1: Developing Objectives and Items

The principal activity during the two-year period was, consonant with the chief thrust of the project, to develop new collections of instructional objectives and test measures. In all, 28 such collections were developed. The total number of objectives produced exceeded 2,000. Finally, over 7,000 test items related t' these objectives were prepared. During the early months of the project, some of these materials were gathered from existing sources throughout the nation. Extensive efforts were undertaken to solicit educators to contribute objectives and items for the project, chiefly through the Instructional Objectives Exchange. Certain of these incoming collections were judged suitable as points of departure; thus our staff was able to build on such materials in the development of new collections. As the months progressed, an increasingly greater portion of development activity occurred within the project itself, with fewer and fewer materials being used from the outside. During the final months of the project, almost all development consisted of producing completely new objectives and assessment devices. As the project proceeded, the staff also became increasingly aware of the steps associated with our development enterprise. Accordingly, we began to involve more and more carefully defined techniques for producing new objectives and test measures. With the most recent collections, for example, far better delineated check points were utilized and more test measures per objective were produced. To illustrate, with some of the earlier collections only one test item per objective was developed, whereas with almost all subsequent collections at least six items per objective were produced.

The response by American educators to the materials we have developed has, thus far, been extremely positive. To illustrate, during the two-year period of the project's existence, well over 30,000 separate collections have been distributed to American educators. These materials, at least those being distributed by the Instructional Objectives Exchange, were being sold (with all revenues being used for subsequent development and revision of the materials). Educators who acquired the objectives generally had to purchase them, and thus a great many educators backed up their interest in such materials with actual financial expenditures.

Purpose Number 2: Quality Control

One of the more interesting areas of activity in connection with the project was related to our efforts to improve the quality of the materials we were developing. In the early days of the IOX operations, the essential mode of operation was "rough and dirty" with the beginning collections resembling materials which had been raked together rather than systematically developed. With the availability of funds

from the current project, however, we were able to be more systematic in appraising the materials and particularly were able to take advantage of a nationwide network of schools created by the Center for the Study of Evaluation. This national network of approximately a dozen schools supplied us with ample opportunities to verify the quality of our materials prior to release. For example, we were able to send first draft and second draft collections to teachers and administrators within these schools for review. As the project continued, these reviews became increasingly systematic and we were able to initiate a number of check-off points regarding external reviewer approval prior to distribution. We also began to explore the manner in which objectives should be revised, particularly those in the affective domain. Certain collections of objectives developed by the Instructional Objectives Exchange under funds from other quarters were systematically scrutinized on the basis of field test information. For example, construct validation approaches were utilized in an effort to judge the validity of certain affective measures regarding children's (1) attitudes toward school and (2) self concepts.

As the project progressed, we began to view quality control in two different ways. First, there was the question of the formal quality of the materials, namely, were we producing any information which was on the face of it inaccurate, imprecise, etc. The second view of quality control related to the value which different individuals placed on the materials. Were certain objectives viewed as more important than others? Did given groups view particular objectives as more praiseworthy than others? Employing this scheme, we were able to investigate the efficacy of securing preference rating information from various quarters and, by making such information available, provide useful data for those who must choose among objectives. In a sense, thereby, these objective selectors were able to exercise their own quality control on the basis of increased access to information which would aid them in making choices among competing objectives. During the middle and latter phases of the project, we were able to try out variations of these schemes for gathering preference data and have reached the conclusion that the procedure represents a viable scheme for guiding educators as they employ their own control mechanisms.

We have also looked carefully at alternative methods of establishing high quality for our test measures. Both <u>a priori</u> and <u>a posteriori</u> approaches were employed during the project to establish the congruency between objectives and measures. The use of Hively's item form approach as well as a number of empirically based tactics were investigated. These activities are described in more detail in Chapter Five of the report.

Purpose Number 3: Classification Activities

Of the three purposes of the project, the classification task was by far the most perplexing. From the very beginning, we attempted to capitalize on previous efforts of those concerned with such classification enterprises and discovered that very few classification procedures had been developed which would prove of any utility. During the early months of the project, research assistants scoured the literature in an effort to find productive alternatives to typical grade and subject level classification schemes. When we discovered that the literature was deficient with respect to such categorization schemes, we turned our attention to securing input from some of the most able educational thinkers in our country. We were able to tap a half dozen or so of the very best minds in the field regarding how this task might be consumated. In gerneral, both internal efforts from the staff and suggestions from the outside proved less than satisfying. The classification task has, indeed, represented a frustrating arena. We have, however, set down our best recommendations regarding the manner in which objectives might be classified and have examined certain procedural questions associated with such classification efforts. These deliberations and resulting recommendations are described in Chapter Six.

Summary

In review, then, this two-year project represented an effort to increase the number of objectives and related test measures available to American educators, to improve the quality of such measures (and to study the manner in which such quality could be assured), and to consider alternative ways to classify these materials for subsequent retrieval. In the five chapters to follow, it is hoped that activities of the project related to each of these three purpeses will be described in sufficient detail to prove of value to researchers and developers engaged in comparable pursuits.

CHAPTER 2

A RATIONALE FOR OBJECTIVES-BANK OPERATIONS

Because this project was conducted throughout in coordination with the activities of the Instructional Objectives Exchange, both when IOX was a project of the UCLA Center for the Study of Evaluation and, more recently, when IOX had operated as a nonprofit educational corporation, it is important to understand the rationale underlying the creation of the Instructional Objectives Exchange. The key ingredient in a useful system which can provide objectives and measures to American educators consists of the basic materials available through that system. This project, of course, was designed to make available more objectives and measures which could be used in such systems as that provided by the Objectives Exchange.

This chapter, therefore, will describe the basic reasons why objective-bank operations are considered useful assests for outcomes-oriented educators. It is gratifying to note that in recent months other agencies* have begun to make available collections of objectives and measures. Undoubtedly such agencies will be making use of the public domain materials produced as a consequence of this project. We can turn, therefore, to an examination of the rational underlying the Instruc- Objectives Exchange, insofar as it is representative of the objectives-bank operations which are beginning to emerge throughout the nation.

Rationale

"The quality of any instructional sequence must be evaluated primarily in terms of its ability to promote desirable changes in the intended learner." This assertion, or statements similar to it, have met with increasing approbation among influential American educators during recent years. Not that it represents a novel conception; one could undoubtedly locate comparable utterances from the very beginnings of educational history. But the increasingly widespread agreement with this

*The Directory of Measurable Objectives Sources can be obtained from the Upper Midwest Regional Educational Laboratory, in Minneapolis, Minnesota or in care of Mr. Arthur Olson, Colorado State Department of Education, State Office Buidling, Denver, Colorado 80203. Objectives and related tests of the Wisconsin Design for Reading Skill Development, an individualized reading system, are also available from National Computer Systems, 4401 West 76th St., Minneapolis, Minnesota 55435.

conception of instructional effectiveness is new. Never before in this country have we had so many educators manifesting commitment to the notion that we should judge instruction primarily by the results it produces in learners.

Criterion-Referenced Instruction

Perhaps the type of instructional strategy being advocated these days can best be described as criterion-referenced instruction. This approach to instruction focuses primarily on the degree to which the learner can perform specified criterion behaviors. For example, in preparing instructional materials the developers decide what to revise on the basis of learner performance data, not according to the judgment of consulting experts. Or in another situation, a school district decides to select one set of supplementary reading texts instead of another because of pupil performance on related criterion tests, not because one set of texts is more attractively illustrated than the other. Such examples accurately suggest that a primary feature of criterion-referenced instruction is a preoccupation with the results of instruction, not the procedures used to promote them. It reflects an ends-oriented approach to instruction rather than means-oriented approach. Since most educators concur that the ultimate index of an educational program's worth is the degree to which it benefits the learner, the increased support of criterion-referenced instructional approaches is gratifying.

But against the increasingly supportive backdrop, it is distressing that very few large-scale criterion-referenced instructional operations are underway. Verbal support is there. Widespread practical implementation there is not. Why?

A Time-Consuming Task. The principal deterrent to expanding the extent of criterion-referenced approaches used in the nation's schools is fairly easy to identify. Developing criterion measures of sufficient quality and satisfactory breadth is too much work for most educators. Developments regarding the use of behaviorally stated educational objectives may be instructive here.

Much of the recent agitation regarding the desirability of describing instructional objectives in terms of measurable learner behavior is based on the belief that operationally stated objectives will more readily permit educators to assess the impact of instruction where it should be assessed, namely, in modified learner behavior. But many proponents of operationally stated educational objectives are beginning to complain about the paucity of such objectives in the schools. Educators can be informed of the merits of behaviorally stated objectives; they can be taught to state objectives properly; they can even become quite enthusiastic about the desirability of stating objectives behaviorally. But few of them do it. The reason is

not unwillingness but, instead, reflects a lack of wherewithall. Teachers are already too burdened to find the time to develop operationally stated objectives for their classes. School districts have already committed their increasingly limited resources to other tasks. In those isolated instances where there has been an effort to develop precise instructional objectives on a large scale, the participating educators will readily admit how taxing the enterprise has been.

Imminent Duplication. The financial and personnel costs of the isolated projects to develop instructional objectives points up another problem. In spite of the difficulties associated with the development of explicit objectives, some districts are undertaking the task. For example, several years ago the Clark County, Nevada School District developed a set of behaviorally stated objectives for mathematics instruction, grades K through 6. There are other examples of such endeavors in various parts of the U.S.

The absence of any scheme through which one district could become aware of the existance of similar developmental projects makes it probable that a distressing amount of duplication will occur among those few educators who are zealous enough to attempt the development of precise instructional aims. For instance, more than a year after the Clark County, Nevada schools had completed their preparation of K-6 instructional objectives for mathematics, two districts in different states commenced work on precisely the same project. They were unaware of the Clark County objectives. The wheel was about to be re-invented.

Not that the Clark County objectives would satisfy all districts; undoubtedly there would be modifications. But the energy that could be saved nationally by adapting extant sets of objectives rather than starting from scratch is incalcuable. For example, several of the USOE-supported regional laboratories are investing significant resources in encouraging educators to develop operationally stated goals. The probable overlap between such efforts and similar projects initiated by local districts is considerable.

Objective-Generators and Objective-Selectors

It has become increasingly clear to those who have been promoting the use of operationally stated objectives that it may be expecting too much to ask already harassed teachers and administrators to generate their own objectives. It is an arduous task and, although the teacher may be willing to state his objectives behaviorally, under present conditions most teachers just can't find the time to do it. But though objective-generation may be too demanding, objective-selection should not be. If the instructor's task were simply to choose from comprehensive sets of operationally stated objectives those which he wished to achieve, his task would be manageable. He

could follow through on his commitments to precisely explicated goals without being obliged to construct all such goals himself. But, obviously, someone needs to construct the objectives from which he can select.

Local Option. Under any scheme in which the educator is the selector rather than generator of objectives there may be some concern regarding the degree to which the objectives will be "imposed from above." A viable objectives selection scheme, however, should permit just that -- the selection of objectives. If particular objectives are not preferred, they are not selected. If all of the objectives are not available which the selector favors, he can always generate additions. Having selected the bulk of his goals from those prepared by others, such an objectives generation task should be manageable. Local autonomy in the selection of objectives should be an integral part of any objectives selection scheme. The availability of objectives from which to choose should increase the educator's range of alternatives, never decrease his self-direction.

Objectives Plus Criterion Measures

Another factor which has not been perceived by all advocates of precise objectives is that they be necessary, but by themselves they are far from sufficient. Too often even a behaviorally stated objective may be used as window dressing for "instruction as usual." A precise objective can be most helpful when planning an instructional sequence, since there is clarity regarding the intended post-instruction competencies of the learner. But an explicit objective becomes even more useful when we evaluate an instructional sequence. This can be accomplished by ascertaining the degree to which the objective has been achieved. To perform the latter function we need measuring devices based explicitly on the objective. A criterion-referenced approach to instruction requires criterion measures.

Few districts have made this logical jump from the development of objectives to the necessity of developing test items. And "test items" here is used in the broadest possible sense, for example, including observation of learner behaviors reflecting a host of cognitive as well as non-cognitive outcomes. If it were possible for school districts to have access to sets of objectives plus test items from which they could choose, then after selecting certain objectives the district could readily assess the degree to which its instructional approaches were successful. A teacher could evaluate his success in achieving his goals. The existence of a pool of test items for each objective would really encourage educators throughout the nation to initiate criterion-referenced instructional strategies.

The Instructional Objectives Exchange

Therefore, to encourage increasing numbers of educators to adopt criterion-referenced instructional strategies and to reduce the probable overlap in objective development efforts, the UCLA Center for the Study of Evaluation has established the Instructional Objectives Exchange which will serve as a national depository and development agency for instructional objectives and related measurement devices. The Exchange will perform the following functions:

1. It will serve as a clearinghouse through which the nation's schools can exchange instructional objectives, thereby capitalizing on the developmental activities of other educators rather than duplicating such efforts.

2. It will collect and develop measuring techniques suitable for assessing the attainment of the objectives available through the Exchange.

3. It will develop properly formulated instructional objectives in important areas where none currently exist, that is, fill the gaps not covered by available objectives.

The potential impact of such an Exchange, readily providing pools of objectives and test items from which districts can select, should not be underestimated. With competent staffing, a careful developmental plan, and proper dissemination strategies, the Exchange could conceivably alter the nature of instructional practice in America.

CHAPTER 3

DEVELOPMENT ACTIVITIES

This chapter will describe the nature of the development enterprises associated with the production of the objectives and measures related to the initial purpose of the project. Three sections will essentially detail three temporal phases of the development operation, i.e., the early, middle, and latter months of the two-year project.

EARLY DEVELOPMENT

In January, 1969 over 8,000 copies of a very brief leaflet describing the purposes of IOX had been distributed along with a questionnaire which educators were encouraged to return indicating whether they had access to measurable instructional objectives. We wished to follow up on those questionnaire responses indicating the availability of such objectives so that they would be relayed, through the services of IOX, to other educators. These leaflets were sent, primarily by mail, to such agencies as the following: superintendents of major school systems, state superintendents of public instruction, directors of curriculum development projects, professional associations, subject matter specialty associations, etc. We were attempting to accumulate as many such collections of measurable goals as we could.

The kinds of objectives we have received during the early months of the project may be of some interest. As of January 1, 1970 approximately 325 collections of objectives had been contributed to IOX. Most of them were organized around units of entire courses within subject matter fields. The majority came from public school districts, although there were many donated from such sources as ESEA Title III centers, subject matter curriculum projects, and individual teachers. Approximately ten percent of these collections included objectives stated with sufficient precision, i.e., measurability, so that they could be readily used by the Exchange, even though all of our solicitations had asked only for measurably stated goals. Less than one percent of the usable contributions fell within either the affective or psychomotor domains.

As these materials became available to the project staff, at that time working closely with personnel from the Center for the Study of Evaluation, the primary method of development consisted of surveying incoming materials to locate those which appeared best stated from a measurability viewpoint, then coordinating these with other incoming objectives in similar subject fields. These materials were then modified, chiefly to eliminate unnecessary duplication and to reduce ambiguity

of the objectives. In addition, more objectives were characteristically devised to fill what appeared to be gaps in the coverage since we were not attempting to be prescriptive, but were intending to present a wide array of objectives from which one could choose; we were anxious not to leave any major omission. After a fairly large pool of objectives had been created, at least one sample test item was developed for each objective, chiefly to further explicate the objective. In some instances, several items were produced for each objective.

As we were receiving and processing more objectives, a major fear arose, namely, that we would have collected and developed a host of objectives and measures but that those materials would not be worth very much. We believed we had to get some reactions from potential users prior to wholesale distribution and, as a consequence, set up a summer institute attended by teachers from various parts of the country. A major function of these teachers was to serve as a screening group regarding the objectives which had been processed primarily by graduate students until that point.

Announcements describing the proposed institute were distributed in the spring to school systems throughout the country. Those interested in participating were advised to indicate the subject matter and grade level of their greatest experience and/or interest, and identify their educational and professional background in that subject matter. In this way we were able to select participants who demonstrated subject matter competence and teaching experience. It was our original intention to work in only four subject areas: mathematics, reading, English literature, and primary physical education. However, because certain applicants wished to work in fields where we had sufficient numbers of objectives and items available to make a reaction group feasible, it was decided to enlarge the number of subject areas to include elementary geography, language arts, music, biology, and nutrition.

The groups were kept small, and in two areas, music and biology, there was only a single individual involved. For the most part, the groups were comprised of from four to eight individuals. Each group worked under the direction of a single leader, although in the smaller groups one individual served as the leader of more than one group. Usually the leader was a research assistant trained in the writing of objectives and items, and with some experience in the subject matter under discussion. In some instances, a leader was chosen in advance from among those who had applied as participants.

The institute took place from July 7 through August 1, 1969, and was attended by 41 participants from 11 different states. The participants lived in a UCLA dormitory, and worked approximately six hours a day. Most of this time was spent in small groups where the work consisted of going over all objec-

tives in the collections IOX was planning to release in the fall. Each such objective was discussed, then discarded, modified, or retained in its present form. In a similar fashion, each item which had been written to test the objectives was examined. The participants also wrote new objectives and items, when it was decided that the collection required specific additions. Initial training was provided for all participants during the first week of the institute and for group leaders during the week prior to the institute.

In our estimate the workshop was successful in accomplishing its goals. The objectives and items gathered from the participants perusal were thoroughly examined and defined. Moreover, many additional objectives and items were written. And finally, we believe the participants themselves gained much from the experience. As the close of summer neared, a more elaborate brochure describing IOX was readied in the form of a catalog. The catalog described in detail the background of the Instructional Objectives Exchange, and through an insert, indicated what collections of objectives would be available during the remaining months of 1969. Approximately 15,000 of these catalogs were distributed by mail. Almost all American school districts of any appreciable size received a copy of the catalog. Once more, a questionnaire was included soliciting contributions of objectives to IOX. The actual distribution of IOX collections commenced in the fall of 1969.

Early Status Data

On January 1, 1970 data were assembled regarding the types of response to the two major mailouts, as well as certain information regarding the orders for objective collections received at that point by the Instructional Objectives Exchange. First, in Table 1 frequencies and percentages are supplied for all questionnaires received either in response to the initial January, 1969 mailing or the summer, 1969 mailing. It can be seen that as of January, 1970 more than 2,500 questionnaires have been received. The percentages for different types of individuals returning the questionnaire are presented, and it can be observed that school administrators and supervisors supplied almost 60 percent of the returns. Questionnaires were received from all 50 states, with California, Minnesota, and Pennsylvania displaying the most activity, returning 18, 12, and 9 percent of the questionnaires respectively.

Table 1. Questionnaires returned to IOX during 1969.

Type of Individual Returning	Frequency	Percent
Federal-State Project Administrator	251	10.0
Principal	355	14.1
School Administrator-Supervisor	1,471	58.6
Teacher	223	8.9
College-University Personnel	183	7.3
Other	14	0.6
Not Given	13	0.5
Total	2,510	100.0

We were interested in any differences in the responses to the original leaflet sent in January, 1969 and the catalog sent in summer. Of the 2,510 responses, 82 percent occurred in response to the leaflet whereas only 18 percent occurred in response to the catalog. Different colored questionnaires permitted this contrast. Obviously, many of those interested in IOX responded to the initial rather than the second document. The breakdown of the types of individuals returning the questionnaire remained approximately the same in response to either the leaflet or the catalog. There were, however, some interesting differences with respect to several items on the questionnaire that these individuals returned.

One of the items cited on the brief questionnaire asked whether measurable objectives were available to the respondent. We hoped to locate available collections of objectives through this item. In response to the leaflets, 48 percent of the respondents indicated that objectives were available. In response to the catalog, only 28 percent indicated the availability of objectives. There are alternative interpretations for this 20 percent reduction. First, of course, it is possible that we reached the majority of individuals who did possess such objectives through the initial mailing. An alternative interpretation is that the more elaborate catalog which contained actual samples of measurable objectives may have induced the respondents to be more conservative in their response to this question.

Similarly, the percentage of respondents indicating that measures for objectives were available to them dropped from 36 percent in response to the initial leaflet to 20 percent in response to the questionnaire accompanying the catalog. Similar interpretations could account for this reduction. For both responses to leaflet and catalog over 90 percent of the

individuals indicated that they would be willing to contribute any objectives and items which were available to them. Ninety-eight percent of both groups of respondents indicated they would be interested in participating in the Objectives Exchange by withdrawing objectives and items suitable for their particular instructional program.

Early Orders Received

Once the catalog went out with its description of the 16 separate collections of objectives which would be available in the fall, orders began to arrive. As of January 1, 1970, IOX had received 854 orders representing all 50 states. Once more, California, Minnesota, and Pennsylvania led in the number of orders with 37, six and six percent respectively. Florida's orders totaled in excess of five percent. The majority of orders arose from local school districts, with 78 percent of the orders coming from that source, 11 percent arising from state educational agencies and the remainder from private, federal, and other sources. The distribution of orders approximated but was not identical to the array of questionnaire returns seen earlier in Table 1. In Table 2, the frequency and percentage of orders are represented according to those same categories for questionnaire responses described in Table 1. As was anticipated, the bulk of the requests centered upon objective collections in the areas of reading and mathematics. Of the 16 collections available during the fall, the heaviest demands were in these areas.

Table 2. Orders Received as of January 1, 1970.

Type of Individual Ordering	Frequency	Percent
Federal-State Project Administrator	3	0.4
Principal	42	4.9
School Administrator-Supervisor	360	37.5
Teacher	56	6.6
College-University Personnel	3	0.4
Other	93	10.9
Not Given	337	39.5
Total	854	100.0

Problems

There were several classes of problems associated with early development activities. The first of these is related to the acquisition and retention of a qualified staff.

Staffing. The key difficulties associated with the staffing of any R & D Center visited themselves upon our project. First, of the approximately 30 research assistants (graduate students) who were hired at the earliest stages of the project, only about six proved sufficiently able and/or diligent to be retained. Although all of these research assistants were well acquainted with the specification of measurable objectives, working in a development context on this particular project did not prove appropriate for all of them.

Training. Because our initial collection of workers were recruited then retained on a selective basis, we undoubtedly trained these people more through the laying on of hands than any kind of replicable training procedures. As a consequence, we continually found ourselves faced with the prospect of employing new staff but having expended only modest energy in developing any systematic training materials to be used in preparing those staff members to work on the project.

Research. With this, as with most developmental projects, there is a considerable temptation to emphasize the development aspects of the enterprise and neglect research inquiry. Although we attempted to conduct research which was correlated with our activities, there was a discernible tendency to become preoccupied with the development of respectable collections of objectives rather than carefully studying the processes by which such collections are acquired and used.

Distribution Pressure. During the early days of the project, there was a considerable amount of pressure from the field to get the materials out, into the schools. There is a difficult decision as to when educational materials are good enough to prove useful and yet not bad enough to promote eternal rejection by educators of the whole enterprise. Does one hold off on distributing materials until they are really polished, or does one distribute them with disclaimers? One of the key assumptions of the Instructional Objectives Exchange is that over time a truly praiseworthy collection of objectives could be assembled. We opted for the more audacious approach, distributing materials which we recognized were far from satisfactory. We asked the indulgence of the user at the same time we solicited from him the reactions which would permit us to improve the quality of our collections. Time will tell whether this strategy has been appropriate.

A Procedural Question. Because the whole basis of the Objectives Exchange approach hinges on the educator's selection, rather than generation, of objectives, it is necessary to consider the most appropriate form in which the objectives should be presented for that selection operation. While the Exchange was focusing on the collection and development of objectives, we faced a key procedural question. In what manner should the objectives be stated? Just how precise must the objectives be? Should sample items be given? One activity early in the project's existence dealt with this issue.

Anyone who has worked much with operationally stated objectives realizes that one can state an objective behaviorally with varying degrees of specificity. But increased specificity typically requires more words. And since we wish busy educators to read these objectives, perhaps too many words per objective would be aversive. Maybe a shorter, somewhat less specific objective plus a sample test item reflecting that objective would be preferred.

Accordingly, for the topic of first grade mathematics (a topic understandable to most teachers) six objectives were formulated, each in two versions. While both were stated behaviorally, one was very specific, while the other version of the same objective was only specific. For example, the very specific version of one objective was as follows:

> Given two pictures, one of which is composed of items which are designated a set, and another which combines members of that set with other objects, the student will be able to discriminate on the second picture those objects which belong to the set by circling them.

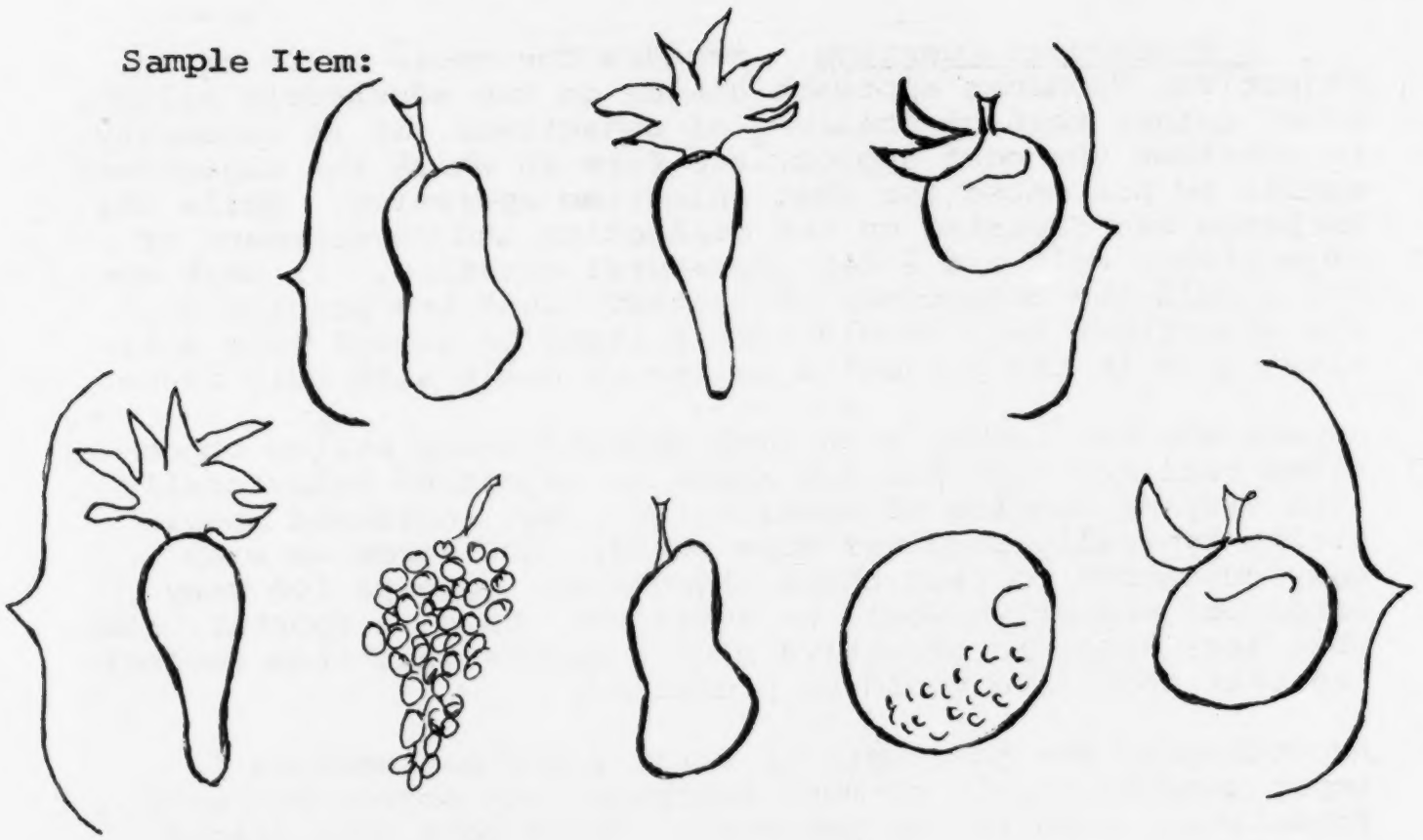
The specific version of that same objective was the following:

> The student will be able to select from a group of objects those objects which have been included as members of a given set.

Three of the six objectives in their very specific form were randomly assigned to one rating sheet along with the other three specific form objectives. A second rating sheet consisted of the remaining objectives, that is, three specific and three very specific. The order in which the objectives were placed in each rating form was also determined randomly.

A third and fourth rating form were developed by adding a sample test item following each objective. For instance, referring to the previous two objective examples, the following sample item was placed below each:

Sample Item:



Thus, four rating forms were available, two without sample items and two with sample items. At the top of each form the following identical instructions were given:

> Please rate each of the objectives on this page in terms of the manner in which it is stated. Do not concern yourself with the content of the objective, only attend to the form. Rate an objective according to how easily and clearly you understand it, so that you might be able to decide whether you would wish to select the objective for use in your own instructional situation. Write the number of the appropriate rating in front of each objective: Excellent-5, Good-4, Average-3, Fair-2, Poor-1.

It should be apparent that we were attempting to discover educator preferences for specific versus very specific objectives, both with and without sample test items. By having teachers rate objectives on two of the forms, for example, we could compare preferences for the specific or the very specific version.

Shortly before the project commenced, the four forms were randomly distributed to 221 Minnesota educators (teachers, supervisors, and administrators) at the conclusion of a two-day conference of the Minnesota Association for Supervision

and Curriculum Development (ASCD). Approximately 50 participants filled out each of the forms. Their ratings supported the very specific versions in 10 of the 12 possible contrasts (on one there was a tie). It had seemed possible that, in rating objectives with items, the less specific objectives might be preferred. Such was not the case. But since the forms had been distributed at the close of a two-day session during which the writer had been the principal speaker and had attempted to encourage the use of measurable objectives, these made methodological problems. The whole thrust of the two-day session had been to applaud specificity. Clearly the data were tainted. Replication was in order.

Fortunately, the writer was again addressing an ASCD group several months later in California and a similar data-gathering venture was undertaken, this time at the beginning of the session, prior to any advocacy of specificity. Approximately 150 California ASCD members (teachers, supervisors, and administrators), meeting at a two-day conference were randomly given the four rating sheets. All of the ratings (5 = excellent, 1 = poor) are presented in Table 3 for both the Minnesota and California educators.

Several analyses are of interest. First, it will be noted that although still preferring very specific objectives, the California educators only selected them in eight of the possible 12 contrasts.

Second, if one compares the California versus Minnesota ratings on each objective, the degree of disparity in favor of the very specific objective form emerges even more clearly. For example, without a sample item, objective number one in its very specific form received a 3.6 mean rating in Minnesota and a 2.7 mean rating in California, the difference of .9 favoring Minnesota. However, in the specific form, the same objective was rated 3.4 in Minnesota and 2.9 in California, the difference of .4 favoring Minnesota. The disparity between .9 and .4 is .5, reflecting a stronger preference for the very specific objective. These differences between differences were statistically significant in favor of the very specific versions (Wilcoxon matched-pairs signed ranks test) beyond the .05 level (two tailed).

The preference for very specific objectives was sufficiently strong to warrant the use of the very specific rather than specific form. It was decided to employ that form during early development activities.

DEVELOPMENT DURING THE MIDDLE PHASE OF THE PROJECT

As the project entered its intermediate phase and the pressure of getting out the initial collections subsided some-

TABLE 3

MEAN PREFERENCE RATINGS FOR SPECIFIC OBJECTIVES VERSUS VERY SPECIFIC BEHAVIORAL OBJECTIVES OF 221 MINNESOTA EDUCATORS AND 151 CALIFORNIA EDUCATORS

		NO SAMPLE ITEM							SAMPLE ITEM PROVIDED						
		GROUP A			GROUP B				GROUP C			GROUP D			
Objective	State	Form	Rating	N	Form	Rating	N	Preference	Form	Rating	N	Form	Rating	N	Preference
1	Calif.	vs*	2.7	38	s*	2.9	39	s	vs	3.3	40	s	3.1	34	vs
	Minn.		3.6	57		3.4	48	vs		3.7	60		3.6	55	vs
2	Calif.	s	3.6	37	vs	2.9	39	s	s	3.0	40	vs	3.3	31	vs
	Minn.		3.7	57		3.5	48	s		3.3	60		3.7	55	vs
3	Calif.	s	3.1	36	vs	3.3	39	vs	s	2.7	37	vs	3.5	28	vs
	Minn.		3.7	55		3.7	47	none		2.3	57		4.0	50	vs
4	Calif.	vs	3.2	37	s	3.1	39	vs	vs	3.1	40	s	3.0	32	vs
	Minn.		3.8	57		3.5	48	vs		3.4	59		2.9	54	vs
5	Calif.	vs	3.4	37	s	3.2	38	vs	vs	2.8	41	s	3.5	32	s
	Minn.		4.4	57		2.9	48	vs		3.5	59		3.4	54	vs
6	Calif.	s	2.6	36	vs	3.9	39	vs	s	3.3	41	vs	3.1	31	s
	Minn.		3.4	33		4.4	49	vs		3.5	59		4.0	54	vs

*(vs) very specific objective *(s) specific objective

what, an attempt was made to be somewhat more systematic in the development of new collections. This section of the chapter details the directions given to staff members assigned to the development of new collections of objectives and items. The questions to be treated are: (1) From what sources can objectives be secured or generated? (2) How should the objectives be organized in a collection? (3) How should the first draft objectives be generated? (4) How often should external reviews be secured? (5) How are test item pools prepared for the objectives?

Sources of Objectives

The first task of an individual assigned to prepare a collection of objectives will probably be to decide where the objectives can be secured. Perhaps another way of putting it is to think of the places where one can either obtain objectives or, perhaps, the content on which objectives can be based. There are undoubtedly more such sources than the following, but at least these should be considered.

Contributed Collections. Since 1968, the Instructional Objectives Exchange has been encouraging educators throughout the country to contribute objectives to the Exchange. If there are any such collections in the Exchange which have already been contributed, this would obviously be a good place to start. In some fields there will be a respectable number of such collections. For others there will be few, if any.

Standard Textbooks. A second source of content from which objectives can be inferred would be the standard textbooks which are used in the subjects and/or grade levels for which the collection is intended. Such textbooks are characteristically available at a university or college curriculum laboratory or at other comparable resource centers. The individual preparing the objectives can consult such texts to note the broad range of topics covered and, as a consequence, can infer what types of objectives might be yielded as a consequence of the student's interaction with such content.

Curriculum Guides. Many school districts have prepared curriculum guides, course syllabi, or other materials which contain instructional objectives. These guides are ordinarily available at any curriculum resource center such as the UCLA Curriculum Laboratory or in the curriculum center of nearby school districts.

Professional Group Recommendations. Another source of possible objectives are reports of professional teachers' associations such as the National Council of Teachers of English. Sometimes these groups have assigned committees to the

task of making recommendations concerning what ought to be taught in the schools.* Often the recommendations will be stated in a form too general for instructional purposes, but suitable for guiding one attempting to prepare new collections of objectives. Consult also the publications of the subject matter professional associations, not associated with education, for example, the American Psychological Association.

Curriculum Projects. Since the 1950's we have seen a number of "new curriculum" projects funded in this country by various philanthropic groups and the federal government. If there is a project, for example, BSCS, SMSG, etc., which bears upon the collections being developed, then it would obviously be advantageous to secure whatever reports exist from such a group in order to see if the project has offered general or specific advice regarding the goals which should be pursued for that field.

There is a real danger that by relying on extant collections of objectives and somewhat out-of-date textbooks that a status quo picture of what ought to be taught will be produced. This might be countered by consulting such groups who have been commissioned to make recommendations regarding current objectives, for their vision regarding the future will characteristically be somewhat more enlightened.

Practicing Teachers. Another group of individuals who can say much regarding what ought to be taught in particular fields are the teachers who are engaged in day-to-day instruction. If the developer of a collection has any teacher acquaintances in the subject or at the grade level of interest, it would be highly useful to get their views regarding what ought to be taught. This can be done either informally or, perhaps, more systematically by employing paid consultants.

In dealing with practicing teachers, one must remember that they will often believe what they are currently teaching is what should be taught. The collection developer may have to encourage them to set aside their perceptions of practical constraints and to view the pursuit for defensible objectives in a more flexible fashion.

Pedagogical Journals. There are some quasi-popular journals published for teachers, e.g., Grade Teacher, Instructor, which may have articles included that suggest possible objectives. By consulting the Education Index, a guide to peri-

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*For example, the Association of Teachers of Social Studies of the City of New York, Handbook for Social Studies Teaching, Third Edition, Holt, Rinehart, Winston, Inc., New York, 1967.

odical literature in education, the developer may be able to isolate some titles of articles which appear promising.

Academicians. While practicing teachers are conversant with the subject matter at hand, they are often too busy to keep up with recent developments in their field. As a consequence, it may be advantageous to consult college or university academicians who are specialists in the field under consideration. They may be able to offer advice regarding what should be taught in that field.

For Affective Collections. Most of the sources identified above are primarily for cognitive objectives collections. If the developer is commissioned to devise an affective or psychomotor collection, there will obviously be different sources. For instance, certain affective dimensions may require one to search the sociological or psychological literature. Often the standardized tests described in one of the Buros' Mental Measurements Yearbooks may give some ideas regarding how to design measures. For indirect approaches, the text* by Webb and others which describes unobtrusive measuring strategies should certainly be consulted.

These are not meant to be exhaustive sources of content for a new collection. Generally, the person developing the collection will have already had some conversance with the field and will have his own ways of isolating possible objectives that should be covered in that field. Additional sources are, therefore, thoroughly appropriate. Remember that the purpose of developing collections of objectives is to make it easier for an educator to organize his instruction around measurable objectives. We do not wish to dictate what objectives should be selected and, thus, should always present a wider range of objectives than would be typically selected by any one educator. This means that the particular bias of the person preparing the objective collection should not constrain the objectives too narrowly. We wish to include objectives which might be chosen by educators who are of a different persuasion than the person or persons involved in preparing a given objective collection. On the other hand, we would not include thoroughly aberrant objectives merely for their atypicality. But to get a general fix on a field, the use of sources such as those outlined above may be useful.

Organization of the Objectives

In general, materials being developed under this project are currently using a grade and subject level classification sys-

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*Webb, E. J., et. al. Unobtrusive Measures: Nonreactive Research in the Social Sciences. Rand McNally and Co., Chicago, 1966.

tem. As a consequence, most of the objective collections fall within a given subject matter, for example, history, and also at particular grade ranges, for example, 4-6. The decision to use a range of grades rather than a single grade was dictated primarily by the fact that in different parts of the country certain objectives which would be suitable at one grade would be inappropriate for the same grade elsewhere. By organizing the collections in the following grade ranges: K-3, 4-6, 7-9, 10-12 (although some collections cover wider grade ranges), we offer the user more latitude in his selection of suitable goals. If the grade range decision has not been made prior to the preparation of the objective collection, you should offer a well-considered recommendation regarding this question as soon as possible.

Early collections produced by the Instructional Objectives Exchange did not even contain a table of contents and, as a consequence, educators had a great deal of difficulty in simply using the booklets. At the very least, we need some kind of organization within the document so that the potential user can more readily employ it. For the most part, the objectives have been organized around topics, although alternative organization schemes are possible, e.g., themes, problems, etc. Perhaps the most important point is to organize the objectives in such a way that the typical user of those objectives in the field will find the collection easy to utilize.

First Draft Objectives

After the initial exploration and decisions regarding how the collections should be organized, there is the necessity to put together a first draft of an objectives collection. It is suggested that prior to engaging in an elaborate amount of work related to this task, the person preparing the collection should describe the organization scheme to be used and then give a limited number of examples of objectives for that organization. Perhaps several objectives for each major classification rubric can be prepared. For instance, if there are eight major categories in the organization scheme, then maybe two objectives per category can be prepared. This scheme can then be presented to someone else for review, so that an inordinate amount of energy is not expended on an organization scheme which is clearly inappropriate. As will be suggested later, the necessity for securing many other people's reactions to the emerging work is particularly important in producing new objective collections, for in these largely unmapped lands one can move in an incorrect direction and thus waste many hours producing objectives that are indefensible.

Generality Level. One of the more difficult questions facing the field of instructional objectives as a whole is how to resolve the level of generality issue. On the one

hand, we want objectives that are clear and that accurately communicate an educational intent. On the other hand, we do not wish to have a thousand objectives in each collection thereby insuring that no one will use them. Therefore, we must certainly be attentive to the kinds of content generality advice which Professor Baker* and others have offered. The objectives ought to be such that they cover a wide range of learner behaviors rather than a single test item. The last thing we want to produce is a set of text item equivalent objectives (i.e., wherein an objective, though measurable, is essentially the same as a single test item), since such objectives would obviously be too numerous to be manageable.

At the moment, however, the resolution of the generality level issue is not in sight. Perhaps the best guidance that can be supplied at this moment is to avoid test item equivalent objectives, but make certain that the objectives are still measureable and will communicate with relatively little ambiguity to users regarding what learner behaviors are sought. In other words, avoid sins of excess in either direction.

Terminal Objectives Sought. Once more to avoid objectives too numerous to be useful, we are concerned with generating terminal rather than en route objectives in the Exchange. While it is true that teachers may have to accomplish a number of preliminary objectives in order to get learners to achieve those presented in our objectives collections, these en route objectives should not be included in the collections. There would simply be too many objectives.

High Level Objectives. In general, we are attempting to produce exemplary collections of objectives which educators can use as models for guiding their instruction. Therefore, we certainly do not wish to produce objectives which are predominantly at the most trivial level of the taxonomic domain in which a given collection is centered. We must not produce too many low level knowledge objectives, but instead should strive for as many high cognitive level objectives as possible.

Although affective objectives are eminently appropriate for any collection, one should avoid the inclusion of affective objectives which would relate to a broad range of subject classifications, for example, assessing the learner's attitude toward a subject matter. Such objectives can be produced in a more general collection devoted exclusively to such learner behaviors.

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*The person unfamiliar with technical questions associated with preparation of objectives should acquaint himself with the standard references on objectives, e.g., Popham, W.J. and Baker, E. L., Establishing Instructional Goals, Prentice-Hall, 1970.

Securing Reviews

It is important to get other people to react to the materials as they are being developed. This includes staff members within the project, teachers, professors, indeed, anyone who can be located who might have something useful to say about the collections. Generally, each person preparing objective collections will have a supervisor and this individual should be contacted at least every two weeks or so to monitor the direction of the development activity. The project does have funds to expend on more systematic reviews and, when appropriate, we should definitely be paying high quality people to look over a collection which is in the process of being formed. The more systematically these critiques can be presented, the better. The developer should try to structure the response of the external reviewer so that the reactions offered are of maximum utility.

As indicated earlier, it would be useful to have someone scrutinize the initial organization (including a few sample objectives) of an early collection. Later on, it would be extremely important to have some external reviewer check the complete range of objectives which have been prepared.

Prior to an objectives collection's final development so that it is available for distribution, we must have a final check from some knowledgeable individual (such as an intelligent teacher working in the grade range specified) so that we do not find ourselves making available indefensible material.

Preparing Items

After the objectives have been approved, it is then appropriate to invest the energy necessary to produce the requisite number of items for a collection. At the moment, we have been preparing one sample item and five additional items, that is, a total of six for each objective. It seems imprudent to produce such items prior to the approval of the objectives since certain objectives may be eliminated. On the other hand, it might be necessary to produce one test item to communicate more fully to a reviewer what the objective is supposed to accomplish. Usually this would not be the case, since the objective itself should be sufficiently clear to satisfy the communication requirement. This very point, in a sense, leads to the perplexing problem of how to prepare homogenous test items which are congruent with the objective they are supposed to measure. This discussion can be initiated with the candid admission that here is an area where the technology is currently quite primitive and where we will be doing a fair amount of stumbling in the next several years.

Nevertheless, we are using the approach of Wells Hively and his associated at the University of Minnesota who have given

as much thought as anyone to considering schemes whereby homogenous sets of test items may be generated to assess the attainment of a given objective. It should be pointed out, of course, that "test item" is being used very broadly to include any testing procedures, not just a paper and pencil test. The scheme that Hively and his colleagues have produced is called domain-referenced achievement testing.

If an objective is stated in measureable terms yet is also somewhat general in form, then diverse types of test items can be produced from it. We can think of such an objective as a measureable but, in a sense, inexplicit objective. On the other hand, one can think of an objective which carries with it so many limiting phrases that there is no question at all about the kinds of measures which would be designated to assess its attainment. Yet, such elaborately stated objectives would probably be of little utility to teachers since they would take too long to read and would, undoubtedly, frighten off the potential user.

As a consequence, we are using the item form scheme which Hively proposes. An item form is something like an intermediate set of delimitations which accompanies an objective and is supposedly of use to the person preparing the test items for that objective. The item forms which we are currently employing must be brief enough so they will be useable for our own staff, yet should contain the ingredients necessary to reduce the variability of items that would be produced to assess the objective. There are three elements in the item forms we have recently begun to employ: (1) instructions to students, (2) stimulus limits, and (3) response limits. A little elaboration regarding each of these elements may be of some value.

Instructions to Students. Generally, test items used to assess an objective will be one of any number of standard forms, for example, multiple-choice, fill-in, etc. It is important to know which kind (or kinds) of items are to be employed. This certainly permits the possibility of more than one type of item. If there are any special kinds of format for the items, this should be indicated in the instructions to the students. In other words, if there are things the students ought to know other than what will be supplied in the actual item, this should be explicated in this part of the item form. Generally, this will be a very brief section of the item form.

Stimulus Limits. This is the really tricky part of the item form. Ideally, this section would delineate all the possible stimuli the students would encounter in any item. For example, in a mathematical problem the stimulus limits section would indicate the possible numerical combinations the student would receive in the stem of the item, and in a selected response item in the alternatives from which he is

to select. Indeed, most of Hively's early work concerns item forms involving mathematics and the sciences. On the other hand, one can think of a history objective in which one might want to describe all possible content such as international conflicts which could be used as eligible elements in test items designed to measure the objective. Yet, to identify all eligible contenders for test items would undoubtedly be too time-consuming, so it would seem to make more sense for us to isolate several classes of content or types of problems (or whatever the objective deals with) which could be used in test items. By trying to identify some examples of eligible elements we may be able to move toward clarity to the desired degree.

On the other hand, if it is possible in one or two phrases to identify the essential attributes which would constitute any eligible stimulus elements, then this should surely be done.

Response Limits. This section should indicate whether a student is to make his response by selecting among alternative choices (which would be defined in the stimulus limits) or would be constructing his response and, if so, whether there would be any constraints such as the room available for the response, the time available for the response, the amount of assistance available (reference books) for the response, etc.

In addition, it is necessary for the person constructing the item form to indicate precisely how one is to judge whether the responses of the learner are correct. Particularly in the case of a constructed response where there is more potential variability in the way people respond, it is crucial to include such criteria. For example, if the student is preparing an essay describing a particular phenomenon, what critical elements must be included in the learner's description in order for it to be considered satisfactory?

Even with selected response items it is important to identify the criteria for judging acceptable selections, since very frequently this will sharpen the item writer's perception of how the item should be constructed. It is insufficient to simply say that a response is correct by stating it is "the correct answer."

A Need for More Systematic Guidelines

As our staff continued to develop objectives collections during the middle months of the project's existence, it became clear that a more rigorous set of guidelines for the development operation was required. Accordingly, we devoted considerable thought to the formal structure which should guide such enterprises. The position taken at the close of the project is presented in the next section of the chapter.

DEVELOPMENT DURING THE FINAL PHASE OF THE PROJECT

This section of the chapter is based primarily on a scheme evolved by E. B. Buck and, while it treats a model primarily associated with development (subpurpose number one of the project), it relates to the quality control activities associated with subpurpose number two of the project.

The following paragraphs present a detailed outline of the activities and decisions involved in the development of collections of instructional objectives. Specifically, a decision model of the development process will be presented. This means that each significant step (decision or activity) in the development process will be described according to:

1) the nature of the activity or decision
2) the person or persons responsible for the activity or decision
3) the resources likely to be used
4) its relationship (sequence) to other activities or decisions

Furthermore, for each decision, the criteria governing that decision are specified. Hence, the decision model can be thought of as a detailed map, including rules, of the development process associated with the preparation of objectives collections.

A diagram of the decision model is shown in Figure 1. The arrows (→) indicate the sequence; rectangles (▭) indicate activities; and diamonds (◇) indicate decision points. The person responsible for engaging in the activity or making the decision is shown in parentheses. A detailed description of each activity and each decision follows the diagram. Since collections will periodically undergo revision, a discussion of how revision fits into the decision model is included in a subsequent chapter.

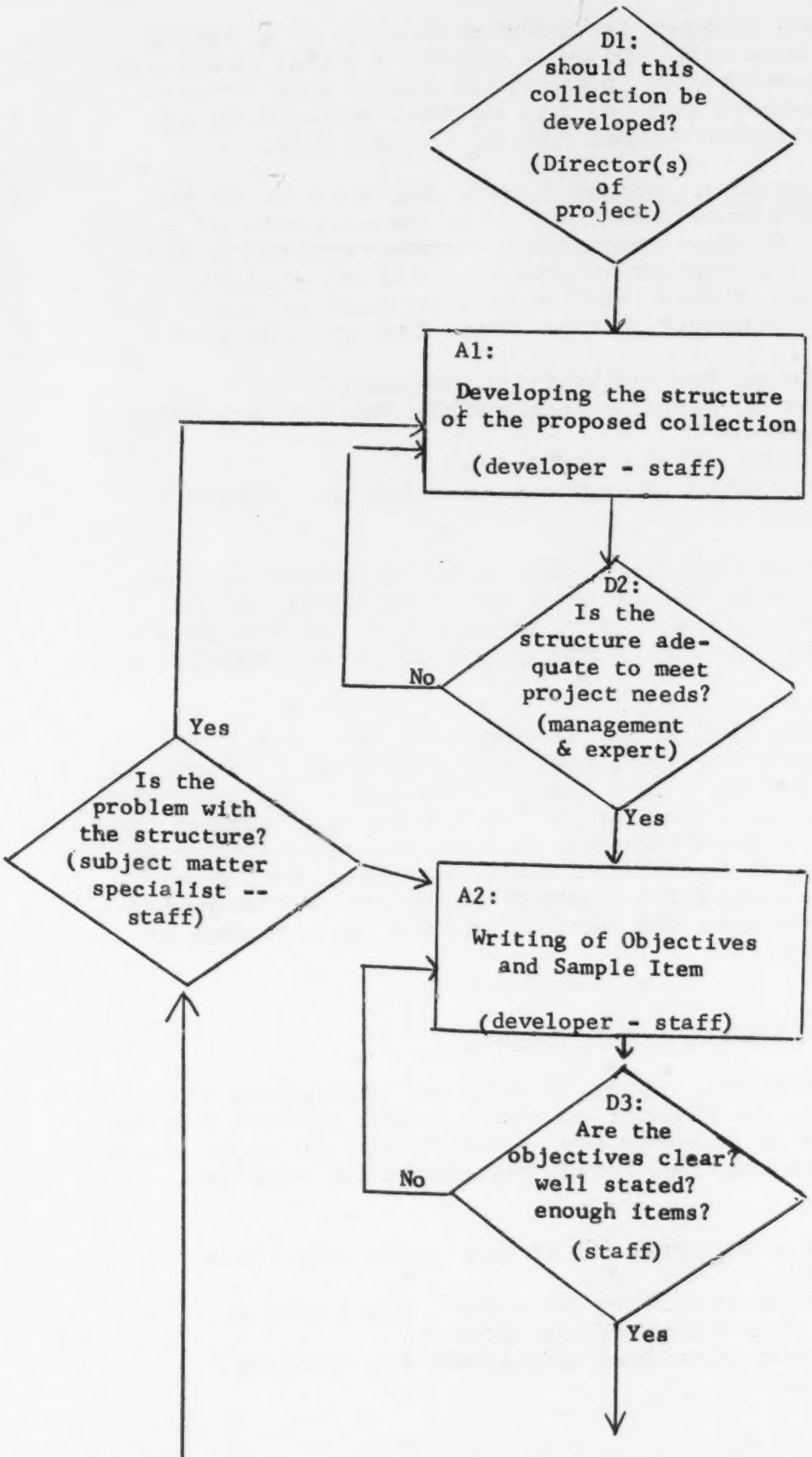
D1: Should this collection be developed?

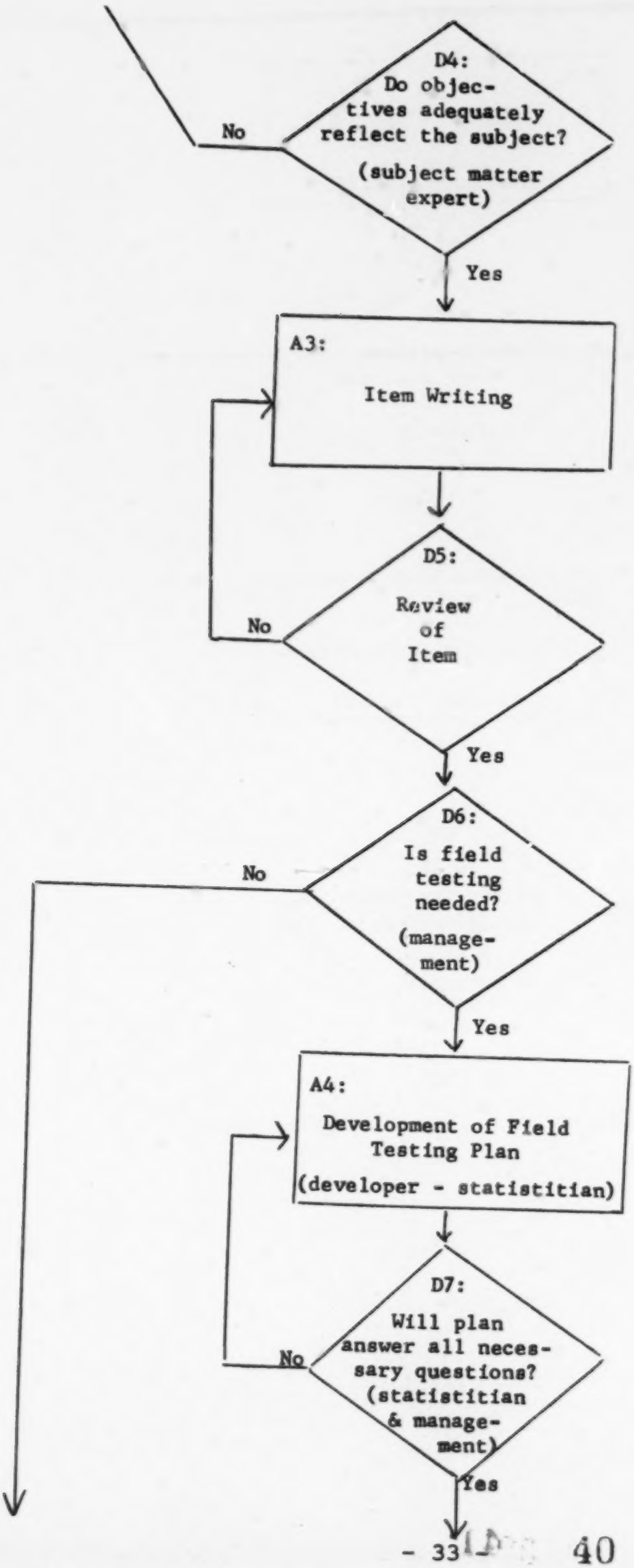
The initial decision (D1), which in essence instigates the development process, is whether or not a given subject matter area should be used as a basis for a collection of objectives. In making this decision, the following questions must be asked:

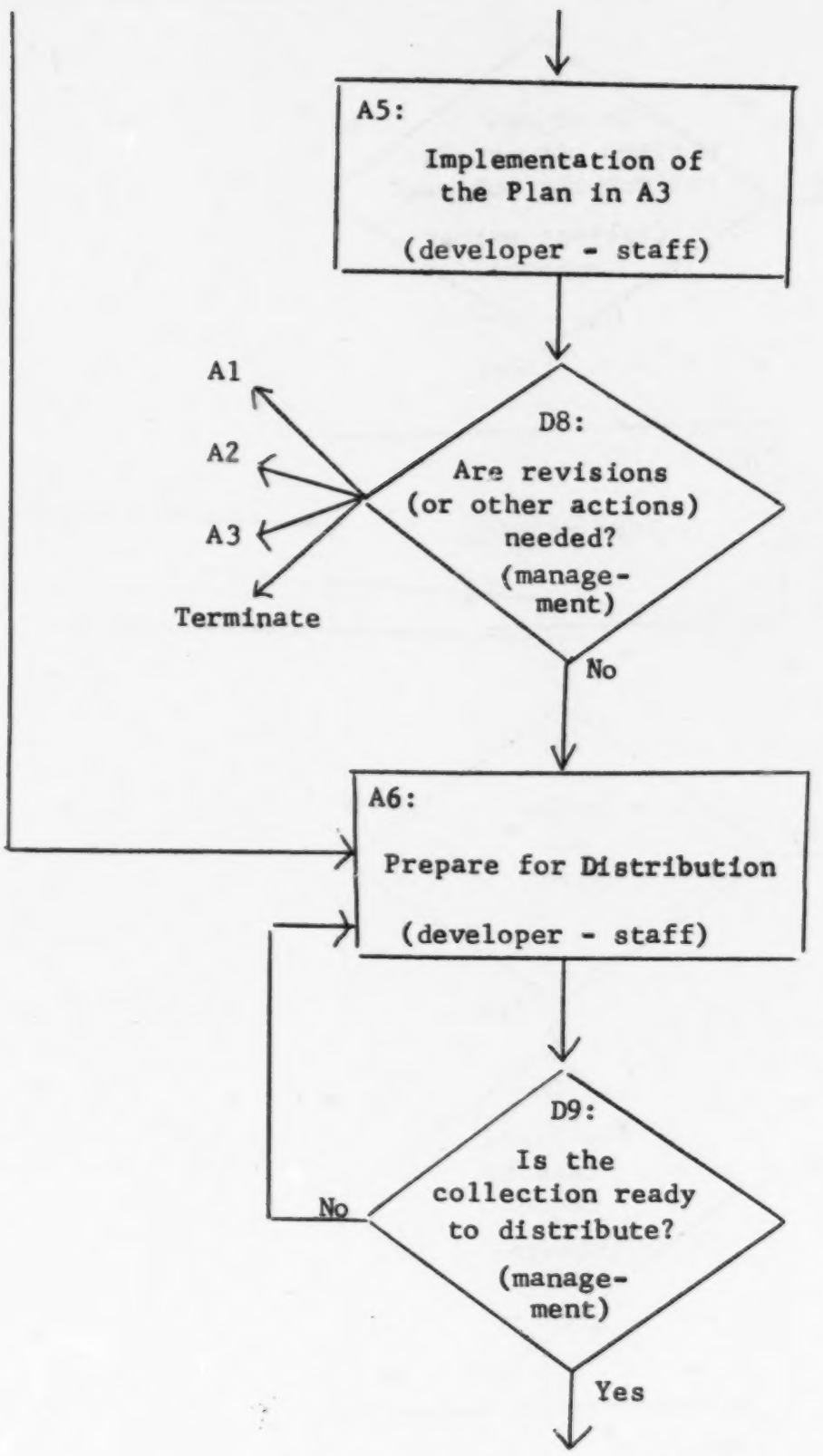
Is the subject area included in any other available collections?
Is the collection likely to be used? (Is there a demand for this proposed collection?)
Are there project personnel available for working in this area?

Figure 1

PROJECT DECISION MODEL




D4:
Do objec-
tives adequately
reflect the subject?
(subject matter
expert)
No
Yes
A3:
Item Writing
D5:
Review
of
Item
No
Yes
D6:
Is field
testing
needed?
(manage-
ment)
No
Yes
A4:
Development of Field
Testing Plan
(developer - statistitian)
D7:
Will plan
answer all neces-
sary questions?
(statistitian
& manage-
ment)
No
Yes



Distribute, i.e., place in public domain

Will the collection be fairly easy, quick, and straight-forward to generate? (Are there contributed collections in the project files which will give us a head start?)
Can the subject conceptually be taught at the level involved?

Obviously, when several areas are proposed, and when resources (manpower, funds and time) are limited, a cost-benefit analysis of the alternatives is needed.

The responsibility for this decision rests with the directors and management of the project. Developers and staff members are, of course, encouraged to investigate and suggest new areas for collections. They should, however, be able to justify any proposed subject matter area in terms of the above questions.

Possible sources of data and information for reaching this decision are:

Structure of knowledge literature
Analysis of content of current collections
Availability and specialty of project personnel
Analysis of school curriculums
Consultation with school personnel

A1: Developing the structure or organization of the proposed collection.

Once the decision to generate a collection in a given area has been made, the next activity (A1) is to formulate a structure for the subject matter or desired student behaviors. In essence, this means identifying major topics and behaviors, then determining their relative importance for the given age level. It is necessary to give weight to areas since these will act as a guide in determining the number of objectives to be included under a given area. If weights are not used, then the number of objectives included under each area is apt to be in proportion to the ease of writing objectives and/or items in that area. In the extreme, we could end up with a majority of the objectives in a collection in an unimportant area. Not only does this place a hardship on the user (he has to select among them!), but it also tends to discredit the validity and representativeness of the entire collection.

The person assigned to develop the collection is responsible for the identification of the structure and the determination of weights.

The following sources of data and/or information might be useful to the developer in performing this task:

Materials in curriculum lab
Published textbooks in area
Current grade textbooks
Consultants (teachers, experts in field)
Professional group recommendations
Journals in field
Curriculum projects in area

D2: Is the structure adequate to meet project needs?

Once a structuring of the subject matter and learner behaviors has been made, it is necessary to determine if this proposed structure is feasible. The following criteria, as a minimum, should be used:

The structure should be readable and logical.
The structure should be such as to facilitate the location of objectives by users.
The structure should be such that it will complement a variety of curriculum schemes.
All major topics of the field should be covered, or justification for the exclusion of topics should be presented.
The categories of behaviors should be higher than the lowest level (Bloom's Taxonomy).
A justification of the weights should be presented.

If the proposed structure fails to meet the criteria, then it will be necessary to restructure the collection (i.e., return to activity 1).

It is the responsibility of the developer, who proposed the structure, to justify that structure according to the above criteria. The final decision to proceed or revise, however, will be made by project management.

In justifying a structure, or determining whether one is adequate, it will be necessary to obtain the opinions of subject matter experts. Also useful would be the following:

Any of those sources listed under activity 1
Educational experts (project staff, teachers, students, administrators, etc.)

A2: Writing of objectives and sample items

Activity 2, the actual writing of objectives and at least one sample item per objective, is perhaps the most time consuming of all the steps on the development process. The purpose of this activity is to write objectives which reflect the scope and depth of the agreed upon structure. The number of objectives for each topic should be in proportion to the

relative weight assigned to that topic. Each objective should be accompanied by a minimum of one item. Later on, more items for each objective will be written. Since the time necessary to write items is often considerable, it is advantageous to have objectives with one or two items reviewed by experts before the developer invests a lot of time in item writing. In the cases of affective measures, where objectives are accompanied by a measuring instrument, it will be necessary to include enough items to give a representative sample of the measure.

The developer of the collection and any staff personnel assigned to the project are responsible for the development of both objectives and items. The division of tasks among project members is left to the discretion of the developer. Sources of possible objectives, or ideas for objectives are:

contributed collections
standard textbooks
curriculum guides
professional group recommendations
curriculum projects
pedagogical journals

D3: Are the objectives well-stated and clear?

At this point, when a first draft of the collection has been completed, we must ask if the objectives are technically correct. As a minimum, the following criteria should be considered:

Objectives should be behaviorally stated.
Objectives should be terminal as opposed to en route.
Objectives should predominantly be at the higher levels of the taxonomies.
The language in the objectives should be precise, with vocabulary well defined.
The objectives should be appropriate to the grade level.
The language in the items should be appropriate to the grade level.
The items should measure the objective without being trivial.
The number of objectives under each topic or behavior class should be proportionate to the weight determined in activity 1 (determining the structure of collections).

If the objectives do not meet the criteria, it will be necessary to return to activity 2 (writing objectives).

The review of the objectives is to be conducted by educational consultants or staff members not involved in the actual

writing of this collection. The decision to proceed or recycle is their responsibility.

D4: Do the objectives adequately reflect the subject matter and weightings?

The last decision point consisted of looking at the objectives from an educational standpoint. Now, they must be considered from a subject matter view. In essence, the collection must satisfy the following criteria:

The entire domain of subject matter as specified in Activity 1 should be covered.
All objectives and items should be technically correct and unambiguous.
The behaviors called for should be behaviors exhibited by someone working in the field.
The number of objectives under each topic should be in proportion to that topic's importance.

If the collection does not satisfy the criteria, it will be necessary to determine whether the problem lies with the structure of the subject matter (activity 1) or with the writing of objectives (activity 2), and then return to that activity.

An acknowledged subject matter expert should review the collection and decide if the collection adequately covers the field.

A3: Item Writing

After approval of objectives and items by the subject matter expert, the developer should proceed to generate additional items for each objective. An objective should have a minimum of six items. The preparation of items is under the direction of the developer.

D5: Review of Items

Just as the objectives with one item underwent extensive review by experts, so should all the items generated in activity 3. Specifically:

The language in the items should be appropriate to the grade level.
The items should measure the objective without being trivial.
The items should be technically valid and unambiguous.

Both educational experts (project director(s) and staff) and subject matter experts will be involved in this review.

D6: Should field testing be conducted?

After review of the collection by experts, most cognitive collections are then prepared for immediate publication. With the affective collections and occasionally with the cognitive collections, it will be necessary to field test items and/or objectives. Field testing would be necessary to obtain any of the following information: teacher, student, or parent ratings of objectives; teacher evaluations of objective collections from subject matter standpoint; teacher evaluation of usefulness of items; and information on student performance on items or inventories. If field testing is necessary, then test designing (A4) will be the next step. If not, then the collection can be prepared for publication (A6).

The decision to field test or not will be made by project management; however, the developer should make a recommendation and provide evidence to support it.

A4: Test Design

When it is necessary to do some form of field testing, then the next activity in the development process is to plan for that field testing. The plan should include the following:

A statement of the purpose and specific questions to be answered through testing.
A description of populations to be tested (students, teachers, etc.) including general characteristics of the district.
A statement of what activities will be expected of all participants.
A description of how participants are to be selected (i.e., sampling plan).
A time table for major steps.
A statement of how the information (results) will be used to revise or make decisions about the collection.
Prototypes of materials to be used in testing.
A description of the type of analysis to be performed on the data.

The test design can be worked out by the developer of the collection or by a statistician or both. Statisticians are available on the project staff to aid in the design and analysis of field tests.

D7: Will the plan answer the specified questions? Are all questions that should be asked being asked?

Once a plan of testing is proposed, it is necessary to carefully examine it to assure that the plan satisfies the purposes of testing. This will assure that the time, effort, and expenses of testing prove profitable. Specifically, the following questions must be asked about the plan:

Do the specific questions being asked provide enough information for decision making? Are there any other questions (purposes) that should be considered?
Is the sample size appropriate?
Is the sample representative of potential users?
Is the load per person unreasonable (i.e., are we asking the subject to spend too much time?)
Are data collecting procedures well defined?
Are the proposed analysis techniques appropriate?
Is all the information necessary being collected?
Is the prototype material appropriate?

Testing cannot proceed until the plan answers all these questions. Staff statisticians and management will determine the adequacy of proposed plans.

A5: Carrying out of Test Plan

Once the test plan is approved, implementation can be started immediately. Activity 5 includes: preparation for testing, collecting data, analyzing data, drawing conclusions and writing the final report. The final report should include:

Summary of testing plan and procedures.
Main results of the analysis.
Implications of the analysis for purposes of revision or other decision making.
Suggested course of action (i.e., revise, retest, redevelop, drop project, etc.)

These activities are carried out by the developer with staff support as needed.

D8: Is revision or retesting of the collection necessary?

The field test results should now be used to decide the next course of action. The alternatives are: publish, retest, revise objectives or items, revise structure (hence also objectives and items), or drop the project. In deciding among the alternative actions, the following questions must be asked:

Do the data support the conclusions (recommended action)?
Is the importance of the revision (if revision is necessary) such as to justify the additional cost?
What is the probability that added work on the collection will significantly improve the collection?

Project management is responsible for making this decision and selecting the alternative to follow.

A6: Prepare Collection for Distribution

Now the collection is "technically" ready -- that is, it has met subject matter and project specifications. The final activity before publication is to add all the introductory information and tables to make the collection usable. Specifically, the following should be included:

An introduction: description of project, its purposes and aims, discussion of how to use the collections; rationale for the collection; results of testing if pertinent.
A table of contents.
A credit page: give credit to developers, consultants, and staff members who worked on collection. References to qualification and associations desirable. (Example: Dr. Joe Blow, Ph.D., Professor of Garble, U.C.L.A.)
Bibliographies, Glossaries, or cross-reference tables if subject matter calls for it.

At this time, it is also necessary to determine the format for objectives and items. Although to date a fairly standard format has been used, this can be varied if such would improve the usefulness of the collections. When the developer feels the collection is ready for publication, he should present it in final form for review to management.

The final preparation of the collection is done by the developer with staff support.

D9: Is the collection ready for distribution?

This represents the final review before a collection is placed in the public domain. Specifically, it will be reviewed to determine if:

An introduction is included and adequate.
The table of contents is included and easily readable.
A credit page is included.
All revisions have been made.

The format is readable and clear.
Each objective has at least six items.

The final clearance of a collection for distribution will come from the director(s).

CHAPTER 4

TWENTY-EIGHT OBJECTIVES COLLECTIONS: DESCRIPTION AND DISSEMINATION

The chief product of this project was the development of collections of objectives and related measuring devices. By markedly expanding the number of such collections available to educators, the project has increased the likelihood that those who wish to employ an objectives-based approach to instruction and evaluation may do so without expending unnecessary energy in the creation of certain materials basic to such enterprises.

In all, twenty-eight new collections of objectives and measures were developed as a consequence of this project. These twenty-eight collections contained approximately 2,000 instructional objectives and 7,000 test items. Because their development was the focal activity throughout the project's existence, a brief description of each collection will be presented in the remainder of this chapter along with the content topics included in each collection.

Following the descriptions of the twenty-eight included collections, information will be presented regarding the dissemination of these materials during the past two years.

THE COLLECTIONS

Language Arts, 4-6

Description: Contents of this collection include structure and types of sentences, parts of speech, capitalization, punctuation, linguistics (word analysis), composition, literature. (194 objectives, 1 item per objective)

Contents:

Grade 4

Grammar-Syntax
Etymology

Grades 4-6

Grammar - Parts of Speech
Grammar - Syntax
Grammar - Phonology
Grammar - Morphology
Mechanics and Conventions
Composition

Oral Language
Reference Skills
Literature

Grade 5

Grammar - Syntax
Phonology
Morphology

Grade 6

Grammar - Syntax
Grammar - Phonology
Composition

English Grammar, 7-12

Description: This collection contains objectives and evaluation items for English grammar in secondary schools. Although there are some objectives which deal with the traditional approach, the main concentration is on the Roberts transformation approach. (84 objectives, 6 items per objective)

Contents: Parts of Speech
Syntax
Morphology
Phonology

English Skills, 7-9

Description: This collection contains objectives and evaluation items for the teaching of English skills in junior high school. (76 objectives, 1 item per objective)

Contents: Composition
Mechanics and Conventions
Diction and Tone
Speech
Mass Media
Reference Skills
Study Skills

English Skills, 10-12

Description: This collection contains objectives and evaluation items for the teaching of English skills in high school. (37 objectives, 6 items per objective)

Contents: Speech
Composition
Mass Media
Reference Skills
Mechanics and Conventions

English Literature, 7-9

Description: This collection is designed to develop the students' ability to analyze literature and to evaluate its effects. (16 objectives, 6 items per objective)

Contents: The Novel

Characterization
Motivation
Conflict and Climax in Plot
Theme
Point of View
Tone
Setting
Relation of the Novel to Experience
Genre

Poetry

Characterization
Genre
Figurative Language
Diction
Repetitive Sound
Tone
Evaluative Process

English Literature, 10-12

Description: This collection is designed to develop the students' ability to analyze literature and to evaluate its effects. (34 objectives, 6 items per objective)

Contents: Poetry

Meaning
Tone
Diction
Figurative Language
Characterization
Repetitive Sound
Evaluative Process
Genre

Novel

Point of View
Genre
Setting
Tone
Characterization
Conflict and Climax in Plot
Motivation
Theme
Relation to Experience

Short Story

Tone
Conflict and Climax in Plot
Point of View
Setting
Motivation
Characterization
Greek and Roman Myth

Drama

Conflict and Resolution
Symbolism and Figurative Language
Levels of Usage
Theme
Dramatic Construction
Setting
Characterization

Non-Fiction

Purpose
Tone
Evaluation

Mathematics, 4-6

Description: This collection covers intermediate concepts and skills. (233 objectives, 4 items per objective)

Contents:
Sets
Numbers, Numerals, Numeration Systems
Operations and Their Properties
Measurement
Geometry
Relations, Functions, and Graphs
Probability and Statistics
Application - Problem Solving
Mathematical Sentences - Order, Logic

General Mathematics, 10-12

Description: This collection emphasizes general concepts and skills. (123 objectives, 6 items per objective)

Contents:
Sets
Numbers, Numerals, and Numeration Systems
Operations and Their Properties
Measurement
Per Cents
Geometry
Probability and Statistics
Logic
Applications, Problem Solving

Business Education (Bookkeeping), 10-12

Description: This collection treats the basic procedures and concepts fundamental to the bookkeeping cycle. (17 objectives, 6 items per objective)

Contents:
Ten Bookkeeping Processes

- Bookkeeping Equation
- Balance Sheet
- T-Account
- Journalizing
- Posting to Ledger
- Trial Balance and Worksheet
- Financial Statements
- Closing Entries
- Post-Closing Trial Balance
- Transaction Process-Explanation

Banking Transactions
Cash Transactions

- Cash Proof
- Petty Cash

Payroll Records
Depreciation
Accrual and Deferred Expense
Vocabulary Skills

Business Education (Business Law), 10-12

Description: This collection is an introduction to the basic concepts and skills of Business Law. (37 objectives, 6 items per objective)

Contents: Foundations of Law

Torts and Crimes

Law of Contracts

Legal Requirements
Franchises, Copyrights, and Trademarks
Assignments
Termination
Treatment of Minors
Liability of Minors
Elements of Fraud
Offers
Illegal Subject Matter
Validity
Sales Contract
Insurance - Automobile
Insurance

Law of Property

Bailments
Distinction Between Real and Personal
Acquisition
Limitations on Ownership
Warranties
Transfer of Title
Mortgages
Title

Law of Negotiable Instruments

Endorsements
Essentials
Defenses

Law of Business Relations and Business Organizations

Government and Business
Agency - Corporation
Agency
Agency - Partnerships
Vocabulary

Business Education (General Business) 10-12

Description: This collection is designed to familiarize the student with some of the concepts which he will find most useful in the business world. (35 objectives, 6 items per objective)

Contents: Vocabulary
Money and Banking Services
Checking Accounts
Cost of Living and Taxes
Kinds of Business Ownership
Sales
Marketing Functions
Insurance and Pensions
Consumer Services
Communications
Employment Application and Interview
Business Math

Business Education (Secretarial Skills), 10-12

Description: This collection emphasizes basic stenographic skills. (46 objectives, 6 items per objective)

Contents:

Typing

Dictation
Composition
Corrections
Care of Typing Station
Multiple Copies
Common Business Forms
Accuracy Percentage Table
Rules for Counting & Marking Typographical Errors

Shorthand

Brief Forms
Dictation and Transcription

Office Machines

Telephone Systems
Automatic Typewriters
Tape Recorders
Postage Meter
Duplicating Machines
Copying Machines
Data Processing Systems
Ten-Key Adding Machine
Printing Calculator
Full Keyboard Adding Listing Machine
Printing Calculator

Office Practice

Behavior and Appearance
Mail Procedures
Personal Interaction
Information Resources
Travel Preparation
Telephone Skills
Preparation of Documents
Filing Systems
Filing Procedures

Business English and Communication

Business Letters
Punctuation
Grammar
Word Usage
Vocabulary
Cover Letter and Resume
Business Interview
Pronunciation - Enunciation
Public Speaking

Home Economics, 7-9

Description: (74 objectives, 6 items per objective)

Contents:
Child Development
Clothing and Textiles
Consumer Practices
Foods and Nutrition
Home Management and Family Economics

Home Economics, 10-12

Description: (48 objectives, 6 items per objective)

Contents:
Child Development
Clothing and Textiles
Consumer Practices
Design Principles
Health Services
Home Management and Family Economics
Housing
Pregnancy

Auto Mechanics, 10-12

Description: (185 objectives, 1 item per objective)

Contents: Automotive Tune-up and Repair

Electronics, 7-12

Description: This collection is an introduction to basic concepts and skills of electronics. (50 objectives, 1 item per objective)

Contents:
Fundamentals
Block Diagrams
Direct-Current Circuits
Primary and Secondary Batteries
Magnetism
Electromagnetic Induction
Direct-Current Generators
Direct-Current Motors and Controls
Alternating Current
Single-Phase Circuits
Operations and Maintenance

General Metals, 7-12

Description: This collection is an introduction to concepts and skills in general metals. (90 objectives, 6 items per objective)

Contents:
Property of Metals
Operations and Functions
Cutting and Shearing
Filing
Cutting Holes
Grinding
Forming and Bending Metals
Metal Spinning
Threaded Fasterners
Soldering
Riveting
Sheet Metal Seams
Polishing and Buffing
Decorating Metal

Mechanical Drawing, 7-12

Description: This collection is an introduction to concepts and skills in mechanical drawing. (85 objectives, 1 item per objective)

Contents:
Basic Drafting Skills
Beginning Lettering
Making the Drawings
Orthographic Projections
Dimensioning
Scale Drawing
Pictorial Drawing

Section Drawing
Auxiliary Views
Production Notations
Thread Conventions and Symbols
Assembly and Detail Drawings
Reference Symbols

Woodworking, 7-12

Description: This collection introduces basic skills and emphasizes the processes involved in woodworking. (56 objectives, 6 items per objective)

Contents:
Sharpening, Adjusting, Using and Caring for Tools
Reading a Working Drawing
Stock Billing
Laying Off Distances & Lines
Clamping Stock
Crosscutting and Ripping Stock
Getting Out Rough Stock
Removing Warp and Wind and Smoothing Irregular Surfaces
Planning Stock
Chamfering
Laying-Out Patterns
Boring Holes
Sawing Curves
Making Joints
Fastening Joints
Sanding
Bleaching
Finishing
Hanging Doors
Mounting Locks
Correcting Defects
Gluing Up Stock
Removing Finishes

American History, 7-12

Description: This collection emphasizes political, social, and economic concepts, problems and fundamental issues in American history from the Pre-Revolutionary period to modern times. (19 objectives, 6 items per objective)

Contents:
Historical Figures
Historical Inferences
Analysis of Data
Historical Speeches
Historical Documents

British Colonial Acts
Values and Goals
Political Philosophies
Political Protest
Military Conflict
Political Influence and Intervention
Society and Culture
Supreme Court Cases
Constitutional Rights and Guarantees
Legislation
Territorial Expansion
Geography
United Nations
Testing Hypotheses

Geography, K-9

Description: This collection reflects major social science concepts in the discipline of geography. (97 objectives, 1 item per objective)

Contents: Geography

Spanish, 7-12

Description: This collection is an introduction to the basic concepts and skills structural to the discipline of Spanish. (74 objectives, 6 items per objective)

Contents:
Understanding
Speaking
Reading
Writing

Music, K-6

Description: This collection reflects major concepts, fundamentals and applications in music appreciation. (97 objectives, 1 item per objective)

Contents:
Melody
Harmony
Melody and Harmony
Rhythm
Musical Form
Musical Sound
Musical Style
Performance
Band Instruments
Wind Instruments
String Instruments

Health (Nutrition), K-6

Description: This collection reflects the major concepts related to Nutrition -- Man and His Food. (24 objectives, 6 items per objective)

Content:
Daily Food Choices
Food Processing
Consumer Education
Nutrients from Food
Nutrients and Disease
Storage - Preparation Methods
Food in Man's Environment
Table Manners

Physical Education, K-3

Description: (44 objectives, 3 items per objective)

Content:
Perceptual Motor
Sensory Motor
Locomotor Skills
Non-locomotor Skills
Balance
Eye-Foot Skills
Eye-Hand Skills
Dance

Anthropology, 4-6

Description: This collection contains introductory anthropological material utilizing some of the material commonly studied in these grades. Different ways of looking at man and societies are presented. (42 objectives, 6 items per objective)

Content:
Man is a Unique Animal
Fossil Man and Prehistory
The Record of Culture
The Nature of Culture
Genetics, Evolution, and Race

CHAPTER 5

QUALITY CONTROL ACTIVITIES

Everyone supports high quality. Given enough time and enough resources, educational developers would prefer to produce the absolutely finest materials and procedures possible. But, of course, we never have sufficient time or resources, and it seems that materials scheduled for development next year are always needed last week. Thus, those engaged in the production of educational materials such as sets of instructional objectives and related test measures are faced with the difficult task of deciding when the quality of their development efforts are of a sufficiently high quality to warrant release. Further, they must devise judgmental procedures, for quality assessment always requires judgment, and decide upon the requisite degree of excellence. In this section of the report, the activities are described which were associated with our efforts to assure defensible quality of the materials being developed.

Reviewer Based Quality Control

In Chapter One of the report, a brief description was given of the increasingly systematized efforts to develop high quality materials during the two years of the project's existence. In Chapter Three, the more detailed description of the development procedures which were used should have revealed an increased sensitivity to the necessity for securing more internal and external reviews prior to release of any products. The chief reason for this heightened concern about reviews stems from appraisals of some of the early collections after they were released. In spite of reasonably well coordinated supervision of developers, and the input/reviews of practicing teachers and subject matter experts, some pretty weak material found its way through such screens and into the early collections. Quite naturally, as one encounters defects in one's earlier efforts, greater care is taken with later work. In several of the early collections, there were too many instances, for example, when test items did not match objectives, when objectives did not match the descriptive categories, or when the objective was simply stated ambiguously. From a project designed to produce clear statements of objectives and related measuring procedures, this approximated inexcusability. Accordingly, as the project continued, more and more care went into securing the criticism of internal and external reviewers who would apply stringent standards regarding quality of coverage, that is, the range of objectives included, and the quality of the materials actually contained in the collections.

An Alternative Conception of Quality Control

In addition to employing reviewer-based techniques for improving the quality of the materials being developed, it is also possible to view quality control in a different fashion. Briefly, by presenting to those educators who will select objectives from the collections an array of data regarding other groups' quality assessments of the objectives, the selector is thereby enabled to make a more enlightened selection of objectives which, for that situation, should be of a better quality. In other words, one can worry about quality appraisals being made both at the point the materials are being developed and at the time selections are being made from the materials. This is particularly pertinent to a project which is producing materials designed to permit selection (and might be less relevant in development of less selection-laden materials, e.g., a textbook). We decided to explore both strategies. The next several sections of this chapter will describe our efforts to devise a rationale and procedures for a "selection assistance" form of quality control and the effectiveness of these procedures when tried out extensively in several public school settings.

Needs Assessment as a Starting Point*

One way of viewing the kinds of information an educator might need in making a quality assessment of possible objectives is to recognize that this is the key requirement when one engages in the identification of the goals for an instructional system, or conducts, as it is often referred to these days, an educational needs assessment.

In the shadow of great concern regarding instructional psychology, educators have been quite properly reminded how imperative it is that any increased instructional sophistication be directed toward defensible educational outcomes. In the last several years, the phrase needs assessment has been employed to describe that operation which is designed to identify those areas of educational deficiency most worthy of amelioration.

Since this discussion will focus on specific problems and solutions associated with the conduct of educational needs assessments, a definition of such operations is warranted at the outset. Briefly, educational needs assessment is a technique for identifying those educational objectives which most need to be accomplished in a given instructional situation. The conception of an educational need in this context is a

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*This section of the report is adapted from a presentation by the writer at three ESEA Title III regional workshops in November and December, 1969.

standard one. First, a desired learner outcome is identified. Second, the learners' current status with respect to that outcome is ascertained. The difference between the current status and the desired status is considered to be an educational need.

Once having identified a number of educational needs, the most difficult task of the needs assessor is to rank these in some way so that the educational system can be directed toward the satisfaction of the most important needs.

There has been growing acceptance of the view that in order to adequately determine the learners' educational needs, we must be attentive to a wide variety of educational outcomes, rather than only the customarily sought types of intellectual achievements. As a consequence, those working in the needs assessment arena are now urging educators to consider the identification of needs with respect to objectives in all three domains of learner behavior, that is, the affective, cognitive, and psychomotor. By cognitive, of course, we refer to intellectual types of learner outcomes. Affective needs pertain to attitudinal, valuing, or emotional types of learner outcomes. Psychomotor needs are associated with a learner's physical and motor skills.

Yet, while this general approach to needs assessment has received substantial support from those individuals actually engaged in such activities, anyone who has attempted to implement this general strategy has discovered that the job is not simple. There are several very thorny problems which must be resolved, whether the needs assessment is conducted at a national, state, or local level.

Problem Number One: Identifying Educational Preferences. In establishing what we wish our students to become, it must be recognized that this operation is exclusively one of valuing. There are no formulas which, if implemented, would obviate the necessity of someone reaching judgments regarding what educational goals ought to be established. But even recognizing that one's values are usually held with varying degrees of defensibility, we still encounter a number of practical difficulties in determining value preferences regarding educational goals. This is, of course, complicated because of the diversity of groups who might wish to influence the establishment of desired educational outcomes. For example, let us assume for the moment that those conducting an educational needs assessment identify parents as individuals who should have a voice in the establishment of educational goals. How are such parental preferences identified? Does a staff member from a needs assessment project interview parents and ask them, in essence, "What do you want your children to be like at the end of their schooling?" One suspects that responses to this general question would be given at such dif-

ferent levels of generality that it might be impossible to categorize parental preferences in a meaningful manner. Similarly, if academicians (or any other group) were to be polled, what practical methods exist for getting definitive, manageable statements from those individuals?

Although several needs assessment groups have tried to approach this preference identification operation faithfully, the procedural requirements of securing an adequate set of preference data from potential contributors have not been resolved.

Problem Number Two: Identifying the Learners' Status. A problem of equal difficulty involves determining the learners' current status with respect to a variety of educational outcomes. Through the years, educators have been inclined to use standardized achievement tests for determining the learners' current abilities. Recent advances in measurement circles, however, suggest the thorough inappropriateness of using typical standardized tests for such assessments. The unsuitability of such tests rests upon a basic distinction between norm-referenced and criterion-referenced approaches to measurement. A standardized test is, generally, a norm-referenced test and is designed primarily to identify an individual's status with respect to a norm group, that is, other individuals who have completed the same test. Because of the necessity to produce variant scores, scores which permit comparisons among individuals, standardized tests are often unable to represent the complete range of learner behaviors which we need to know about.

Criterion-referenced tests, on the other hand, are designed to measure a learner's status with respect to a specified performance standard and, as such, are more suitable for purposes of needs assessment. Unfortunately, criterion-referenced tests do not exist in quantity. No established commercial test distributors have developed a sufficient number of criterion-referenced tests to be of any real utility to a needs assessor, and without such tests, one cannot adequately measure the learners' current status regarding the outcomes in which we might be interested.

Problem Number Three: Contrasting Preferences with Status. Referring back to the general model for identifying educational needs, it is important to note that learners' current status must be contrasted with (usually subtracted from) desired learner outcomes in order to determine an educational need. Particularly because of the unsatisfactory methods being used to establish educational preferences and learner status, these comparisons are not easily produced. For example, what happens if a group of businessmen respond in rather general terms to a needs assessment interviewer that they are looking for young men and women who can per-

form different kinds of clerical tasks, while actual data regarding learner post-high school clerical competencies are very specific? Comparisons are difficult, if not meaningless. The procedural problems of contrasting current learner status with preferred learner outcomes are very real and have not yet received sufficient attention from those involved in educational needs assessment.

Collections of Instructional Objectives and Related Measures. As can be seen from the three problems previously identified, the primary difficulties of implementing the usual needs assessment model are procedural. While we may have the wisdom to devise a general strategy, the primary technical deficiency rests on inadequate vehicles for securing the right kind of data.

One significant advance in recent months has been the establishment of objectives-bank agencies which are attempting to collect large numbers of instructional objectives, stated in measurable terms, plus sets of devices to measure each of these objectives. With the existence of such collections of objectives and items, some procedures for dealing with each of the three problems identified above can be devised. A systematic approach to needs assessment employing these objectives-items collections will be described in the remainder of this presentation.

Problem Number One Solved. By presenting sets of measurably stated objectives to potential reference groups, that is, the groups of individuals whom the needs assessment staff wishes to involve in its survey, the needs assessor can derive a systematic set of preferences because the sets of objectives can be presented in a relatively constant form to the various groups. For instance, let us suppose that we wish to involve representatives of (1) the community, (2) the learners themselves, and (3) educators in establishing the desired goals of an educational system. A set of objectives from available collections, each perhaps accompanied by a sample measurement item to more clearly communicate the nature of the objective, would be presented to representatives of each of these three groups. It might be necessary to modify the language of the objectives somewhat for the different groups, for it may not be realistic to expect young learners and certain community representatives to understand the technical language which would be comprehensible to educators. However, even with such modifications, the basic set of objectives would remain the same.

We could ask these groups to appraise the objectives in a variety of ways. A very simple approach, for example, might ask the representative individuals to rate or rank each of the objectives for purposes of its possible inclusion in the school curriculum. Ratings might be supplied according to the degree

of importance the individual attached to the objective. These ratings, for example, supplied on a five point scale, could be used in developing average estimates of the importance attached to each objective by the particular group involved. The preferences of the several groups could be arrayed in a relatively simple manner which would permit comparisons among the average ratings for each objective and, of course, the identification of those objectives considered most important by all groups. Similarly, objectives considered unimportant by all three groups would, once identified, undoubtedly be eliminated from further consideration. In instances where there was significant disagreement among the participant groups, further exploration among group representatives might reveal the reasons for such disagreement and, possibly, a way to reconcile the disparate ratings. On the other hand, in such instances of disagreement, it is perfectly reasonable to attach more weight to the preferences of one group than another. This is a philosophic issue which would clearly have to be faced by those conducting the needs assessment.

Problem Number Two Solved. As indicated before, the use of norm-referenced tests for the assessment of current learner competencies is impermissable. However, the existence of pools of test measures for the objectives which are being used makes possible the ready preparation of criterion-referenced tests. A set of such items, randomly drawn from the available pools, could be administered to the learners and data could be secured regarding the degree to which the learners were able to master the objectives. These measuring items are not necessarily designed to produce variance among learners. They are simply designed to be congruent with the objective and, as such, represent the most adequate reflection of the objective's attainment. The avoidance of standardized tests and the use of such criterion-referenced test items (for each objective identified as desirable, on the basis of preference data) will yield a far more sensitive reflection of current learner status regarding each objective.

Problem Number Three Solved. Since both the objectives and the test measures employed are drawn from the same agency, comparisons of preference and current status data are rendered far more simple. We would only have to calculate the average preference estimates for each of the involved groups, then identify the percent of students mastering the objectives. These comparisons could be presented in summary form such as seen in Table 4.

It is now necessary, of course, to make those difficult decisions regarding which objectives, among competing alternatives, reflect the most important educational needs. While we do not yet have a simple computer program which could take such data and pump out a precise identification of the most cru-

cial student needs, a careful appraisal of such information should yield far more enlightened choices among alternative needs than by using currently extant schemes.

	PREFERENCE DATA			PERFORMANCE DATA
	Mean Ratings			Pre-instruction
Objective	Community	Learners	Educators	%Mastering
#1	4.3	4.6	4.4	14
#2	2.1	2.5	3.1	68
#3	1.2	1.4	1.5	20
#4	4.7	2.1	4.0	31
#5	3.1	4.6	2.0	84
etc.				

Table 4. *A Hypothetical Comparison of Preference and Performance Data.*

Person and Item Sampling. In using the procedure recommended here, it is important to use sampling procedures judiciously throughout, both with respect to sampling the people involved as well as the items to which they are responding. For purposes of economy, we would undoubtedly wish to select only a sample of individuals from the several clienteles involved. For instance, if we wished to use teacher groups in a statewide assessment, then we ought to employ sampling procedures so that we do not burden all teachers in the state with the task of rating objectives. Similarly, samples of students would need to be chosen for testing purposes.

While the value of such person sampling is generally recognized, the utility of item sampling has not been comprehended by most needs assessment personnel. Item sampling permits one to administer different items to different people in order to obtain a group estimate. In other words, if I am testing 100 students and wish to know how the 100 students perform on four objectives, I might constitute a test of four separate parts, each part reflecting one separate objective, then randomly administer each of the different sections to only 25 students. Since a sizable portion of the class would be responding to each test item, I could secure a perfectly adequate indication of the degree to which students could master those items.

Similarly, we need not subject parents to the necessity of rating hundreds of objectives. We could, instead, put to-

gether a variety of different short sets of objectives and let randomly selected parents rate anywhere from 10 to 20 objectives, thereby taking no more than a few minutes of each parent's time. The use of person sampling and item sampling procedures is requisite in the economic implementation of this approach to needs assessment.

A Self-Correcting Quality Control System. While not all of the problems to be faced in implementing this approach to educational needs assessment systems have been identified, for it has not been used on a wide-scale basis, certainly the strategy is sufficiently manageable to permit improvement as it is employed. Through the assembly of collections of instructional objectives and related criterion measures, coupled with the efforts of those who would systematically determine educational needs, we will surely increase the quality of our educational needs assessment operations so that we can identify the high quality educational objectives we really ought to be pursuing.

Field Testing the Selection-Assistance Strategy

As the foregoing approach to securing preference ratings as selection-assistance data became more formalized, several small-scale field trials were undertaken, some involving only a few students, parents, or educators. A somewhat more extensive field test was conducted in January, 1971 to assess the adequacy of the procedures developed at that point. This next section of the report describes that investigation.*

The study focused on a collection of 19 U. S. history objectives developed as part of the project. Each objective was rated by four different groups. Average ratings from four different kinds of people were thus secured and, subsequently, rankings of the various objectives in order to provide some gross estimates of the degree to which each objective was preferred by a different type of rater, that is, the quality assessments made by each group.

Subjects. The four rater groups involved were students, 71 tenth grade pupils; teachers, 17 U. S. history teachers; parents, 25 parents of high school youngsters; and futurists, ten individuals commissioned to rate objectives in terms of their future suitability.

The teachers, students, and parents were drawn from a middle class suburban school district in Southern California. The students came from three tenth grade classes, while the

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*Adapted from a presentation by the writer at the annual meeting of the California Educational Research Association, April 29-30, 1971.

teachers, each instructing one U. S. history class, were all employees of the same school district. Seven of the parents were parents of students involved in the student sample, while eighteen were parents of students in a neighboring high school.

The futurists consisted of four advanced graduate students (economics, history, education, English), three professors (economics, English, history), two professionals (a pharmacist and a lawyer), and one housewife. Each individual in the futurist group had either already read Alvin Toffler's Future Shock, which deals with the importance of preparing for a future society or were obliged to read a 40-page excerpt from that volume. They were instructed to project themselves forward to the year 1985 and rate the history objectives according to their suitability for that future period. The purpose of utilizing a futurist group was, of course, to test the viability of a scheme such as Toffler proposes in which "Counsels of the Future" serve to guide educational systems in such a fashion as they will be more appropriate for a more rapidly changing society.

Procedure. The four rater groups were provided with a set of the nineteen objectives and a rating form which asked them to rate each objective on a five-point scale in terms of its importance that students be able to achieve the objective. A five-point rating reflected an objective which was deemed extremely important, while a rating of one indicated an extremely unimportant objective. Copies of the instructions given to each rater group and the nineteen objectives involved are supplied in Appendix A.

Results. In Table 5, the mean ratings for each objective are presented for the four rater groups, as well as a ranking by a group of each objective based on these mean ratings.

It can be seen that, as expected, there was considerable variation among the mean ratings supplied by the four different groups. The average mean rating of the students was 2.96, for the teachers it was 3.25, for the parents it was 3.27, and for the futurists it was 3.31. The degree to which the rankings of the objectives by the four groups tended to coincide is revealed by the rank order intercorrelations among the four sets of rankings. These relationships are presented in Table 6, where it can be seen that very strong relationships were present among rankings supplied by students, teachers, and futurists, while the parent group produced ratings which were at some variance with the other three groups.

A Procedural Question. There are a number of procedural questions, some minor and some major, which must be examined in using an approach such as this. For example, to what ex-

Table 5. Ranked Mean Ratings of Nineteen History Objectives by Students, Teachers, Parents, and Futurists.

Objective	Students n = 71 $\bar{X}$	Rank	Teachers n = 17 $\bar{X}$	Rank	Parents n = 25 $\bar{X}$	Rank	Futurists n = 10 $\bar{X}$	Rank
A	3.09	8	3.29	10	3.72	4*	3.00	12
B	2.84	13	3.12	12	3.17	12	3.90	6
C	2.47	18	2.65	17*	3.72	4*	2.50	16*
D	3.06	9*	3.18	11	3.12	14	2.90	13
E	3.18	4	4.12	1	3.42	9*	4.60	2
F	2.90	12	2.88	15	3.00	15	2.60	15
G	3.26	3	3.47	6*	3.88	2	3.60	8
H	2.83	15	3.35	9	3.58	6	3.20	10
I	3.06	9*	3.00	14	3.56	7*	3.30	9
J	3.48	1	3.88	3	3.56	7*	4.10	4
K	3.17	5	3.53	5	3.84	3	4.00	5
L	3.13	7	3.47	6*	3.28	11	3.80	7
M	2.14	19	2.29	19	2.56	16	2.50	16*
N	3.38	2	3.59	4	4.16	1	4.20	3
O	2.85	13	3.06	13	3.42	9*	2.70	14
P	2.67	16	2.82	16	2.43	18	2.20	18
Q	2.61	17	2.65	17*	2.00	19	2.00	19
R	3.01	11	3.41	8	3.16	13	3.10	11
S	3.16	6	4.06	2	2.55	17	4.70	1

*indicates tied ranking

Table 6. Rank order intercorrelations among objectives rankings by students, teachers, parents, and futurists.

	Teachers	Parents	Futurists
Students	.89	.48	.83
Teachers		.41	.91
Parents			.42

Significance levels: p .05, R_s=.46; p .01, R_s=.60

tent are average ratings (and subsequent rankings) of objectives satisfactory or should alternative schemes, e.g., paired comparison approaches be employed? How will variations in the instructions to the raters modify the differential preferences displayed by the various groups? In a more practical vein, what data gathering procedures will prove economical in securing large quantities of such preference data?

During the course of the project, a number of procedural variations were tested regarding these kinds of questions. For example, one investigation attempted to verify the efficacy of several different procedures for securing parental ratings. In the first variation, representatives from the project went to the classroom and administered the surveys to the students, allowing the students to carry them to parents and return them after parents had completed the forms. In a small-scale field trial, this procedure yielded a 36 per cent return. The second procedure involved the teachers' receiving materials exclusively by mail (no project personnel present in the schools) with parental rating forms once more carried to parents and returned by students. In this case, a 68 per cent return resulted. A third procedure found materials administered by mail to teachers but students asked to provide home mailing addresses on a response form. Subsequently, rating forms were mailed directly to parents with instructions to return them to the classroom via students. This technique yielded an 85 per cent return. The fourth procedure was essentially the same as the third except that parents returned the rating forms by mail, not by their children. This procedure yielded a 91 per cent return.

The cost effectiveness consideration involved in these kinds of enterprises are still unresolved. There would obviously be difficulties, for example, in having students supply their parents' home addresses, for in certain school districts, this would undoubtedly be viewed as an invasion of privacy.

This brief account is supplied only to indicate the myriad procedural questions one faces using this approach. Most of the questions are amenable to empirical solutions but, of course, take a considerable amount of energy.

Even though the resources requisite to study the problems of goal determination via preferential ratings of extant objectives are considerable, the possibility of producing an improvable technology for curriculum workers seems a sufficiently alluring prize that the energy expenditures may well be warranted.

A Major Field Trial*

In May, 1971, the project staff, in cooperation with the Culver City Unified School District (Culver City, California), conducted a rating study asking three subject groups to rate certain objectives. The purpose of the rating study was twofold. First, it was designed to test procedures developed during the project for the obtaining of such ratings. Second, it was designed to obtain ratings of the specific objectives used, information which would be used in the revision of the collections from which the objectives were chosen.

Objectives Used. The objectives used in the rating study were those which formed the Study Skills sections of the Reading collections distributed by the Instructional Objectives Exchange. Thirty objectives were taken from the K-3 Reading collection, fifty-two objectives from the 4-6 Reading collection, and twenty-five from the 7-12 Reading collection.

Subjects. The survey was conducted using teachers and classrooms from six elementary schools, one junior high school, and one senior high school. Fifty-six classrooms formed the basis of the survey.

The three rater groups involved were students, 575 at the 4-6 grade levels and 323 at the 7-12 grade levels; parents, 186 at the K-3 grade levels, 364 at the 4-6 grade levels, and 104 at the 7-12 grade levels; and teachers, 15 at the K-3 grade levels, 23 at the 4-6 grade levels, and 7 at the 7-12 grade levels.

The survey encompassed subjects from all income levels, high through lower, and different socio-economic backgrounds. The teachers, at the junior and senior high school levels (grades 7-12) were all instructing at least one English or reading class. All of the parents were parents of students involved in the student sample.

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*This section of the report was prepared by Hal S. Malkin, who also coordinated the field trial.

Procedure. A complete description of the procedure and documents used can be found in Appendix B. Presented here is a brief summary of the procedure used to aid in the understanding of the results.

Survey kits were distributed to the fifty-six classrooms which were chosen to participate in the survey. Sixteen classrooms received the K-3 objective sets, twenty-eight classrooms received the 4-6 objective sets, and twelve classrooms received the 7-12 objective sets. Half of the classrooms received objective sets which contained a sample test item included with each objective, while the other half received objective sets which were without sample test items. Because previous field trials had indicated that the maximum number of objectives students and parents were willing to rate before boredom or fatigue set in was approximately ten objectives, the objective sets were randomly broken down as follows*:

1. The thirty K-3 grade level objectives into three sets of ten objectives each, each set labeled either A, B, or C.

2. The fifty-two 4-6 grade level objectives into two sets of eight objectives and four sets of nine objectives labeled D, E, F, G, H, and J.

3. The twenty-five 7-12 grade level objectives into two sets of eight objectives and one set of nine objectives, labeled M, N, and P.

The survey sets were distributed in the classroom by the teacher. The students then completed their part of the survey and were instructed to take home the survey set and have the parents complete their part. The parent's response form was then returned to the school. The teacher was also requested to rate the objectives.

Each objective was to be rated on a five-point scale in terms of its desirability of being included in classroom instruction. A five-point rating reflected an objective which definitely should be included in the instruction, while a rating of one indicated an objective which should definitely not be included in classroom instruction.

Results. Of the 56 classrooms which received survey kits, completed response forms were received from 51. Six of those received had to be rejected either because they were incomplete or had been improperly completed. Thus, this yielded 45 sets from which to obtain the desired information.

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*All objective sets are included in Appendix C. For purposes of illustration, the test items used with Set A are included in Appendix D.

Parent response forms numbered 52 per cent of the total number of student response forms received at the 4-12 grade levels. (Students in the K-3 grade levels did not receive response forms; only the parents and teachers were requested to rate the objectives.) Classroom returns show a range from 14 per cent to 100 per cent in terms of parent responses to student responses.

In Table 7, the mean ratings for each objective in the K-3 objective set are presented for the two rater groups. Also presented is a ranking by group of each objective based on these mean ratings. At the bottom of each column is presented the average mean rating supplied by each group.

In three of the six groups there was considerable variation among the mean ratings supplied by the two groups, although both groups tended to rate the objectives high on the scale. The degree to which the rankings of the objectives by the two groups tended to coincide is revealed by the rank order correlations between the two sets of rankings. These relationships are presented in Table 8 where it can be seen that in only one case was a very strong relationship present among rankings supplied by the parents and teachers.

Table 9 presents the mean ratings for each objective in the 4-6 objective set. The entire set was divided into six smaller sets, and the data are presented in terms of these smaller sets. In this instance, data are included for students as well as for parents and teachers.

There was considerable variation among the mean ratings supplied by the three different groups. The average mean rating of the different groups, shown at the bottom of the average rating column, ranged in one case (Set H without sample test items) from 2.79 for students to 4.10 for parents and 4.08 for teachers. Table 10 presents the rank order intercorrelations among these three groups.

Table 11 presents the mean rating for each objective in the 7-12 grade level objective set. Again we find a large variation in the average mean ratings among the three groups, and again the student ratings tended to have a greater variance with parent and teacher ratings than did parent and teacher ratings with each other. Table 12 presents the rank order intercorrelations among these three groups. It can be seen that in four of the six cases there was a significant correlation between the student and parent rankings and in three of the six cases a significant correlation between the parent and teacher rankings. But in only one case was there a significant correlation between student and teacher rankings.

As stated earlier, one of the main purposes of the field trial was to test procedures developed during the project for the obtaining of user preference data.

Table 7. Ranked Mean Ratings of 30 Study Skills Objectives by Parents and Teachers (K-3 Grade Levels).

GROUP A

Objective (With Sample Test Item)	Parents n = 25 $\bar{X}$	Rank	Teachers n = 7 $\bar{X}$	Rank
A1	3.88	6	4.00	6*
A2	4.60	1	4.14	5
A3	4.24	4	4.71	2
A4	3.56	10	4.29	4
A5	3.84	7	4.57	3*
A6	3.76	8	3.71	8
A7	4.29	3	4.86	1
A8	3.68	9	4.00	6*
A9	4.16	5	3.17	9
A10	4.46	2	4.57	3*
	4.05		4.20	

Objective (Without Sample Test Items)	Parents n = 32 $\bar{X}$	Rank	Teachers n = 7 $\bar{X}$	Rank
A1	2.92	10	3.43	10
A2	4.63	1	3.86	8
A3	3.66	8	5.00	1
A4	3.78	7	4.23	5
A5	3.88	4	4.86	2*
A6	3.84	6	4.57	4
A7	4.61	2	4.86	2*
A8	3.87	5	4.00	7
A9	3.47	9	3.57	9
A10	4.50	3	4.14	6
	3.92		4.25	

*indicates tied ranking

GROUP B

Objective (With Sample Test Item)	Parents n = 27 $\bar{X}$	Rank	Teachers n = 7 $\bar{X}$	Rank
B1	4.37	7	4.43	3*
B2	4.31	8	3.86	8
B3	4.17	10	4.00	6*
B4	4.41	6	4.00	6*
B5	4.30	9	3.43	10
B6	4.56	3	4.86	1
B7	4.70	1*	3.71	9
B8	4.70	1*	4.57	2
B9	4.48	4	4.43	3*
B10	4.43	5	4.43	3*
	4.44		4.17	

Objective (Without Sample Test Item)	Parents n = 32 $\bar{X}$	Rank	Teachers n = 7 $\bar{X}$	Rank
B1	3.93	9	3.86	8
B2	4.68	1	4.71	1*
B3	3.97	8	4.23	6*
B4	3.83	10	4.71	1*
B5	4.09	7	3.57	9
B6	4.28	4	4.57	4*
B7	4.23	5	3.43	10
B8	4.45	3	4.57	4*
B9	4.55	2	4.71	1*
B10	4.14	6	4.23	6*
	4.22		4.26	

*indicates tied ranking

GROUP C

Objective (With Sample Test Item)	Parents n = 19 $\bar{X}$	Rank	Teachers n = 7 $\bar{X}$	Rank
C1	4.58	3	4.14	8
C2	4.68	1*	4.43	3*
C3	4.68	1*	4.71	1*
C4	4.16	8*	4.29	6*
C5	4.47	4*	4.43	3*
C6	4.21	7	4.29	6*
C7	4.47	4*	3.57	9*
C8	4.22	6	3.57	9*
C9	4.00	10	4.71	1*
C10	4.16	8*	4.43	3*
	4.36		4.26	

Objective (Without Sample Test Item)	Parents n = 22 $\bar{X}$	Rank	Teachers n = 7 $\bar{X}$	Rank
C1	4.57	4	4.57	5
C2	4.50	5*	4.00	9
C3	4.58	1*	4.86	2*
C4	4.28	7	3.86	10
C5	4.58	1*	4.86	2*
C6	3.42	10	4.23	7
C7	4.58	1*	5.00	1
C8	3.47	9	4.14	8
C9	4.50	5*	4.71	4
C10	4.17	8	4.43	6
	4.27		4.47	

*indicates tied ranking

Table 8. Rank Order Intercorrelations Among Objectives by Parents and Teachers (K-3 Grade Levels).

	Parent/Teacher
Objective Set A	
With sample test items	.51
Without sample test items	.26
Objective Set B	
With sample test items	.53
Without sample test items	.35
Objective Set C	
With sample test items	-.22
Without sample test items	.75*

*significant at $p < .05$ level

Cost effectiveness considerations combined with results obtained in the small-scale field trials described earlier resulted in the distribution system chosen for the large-scale field trial. (See Appendix B for a description of the various systems tested.) Using the school district's mail distribution system to get the materials to the classroom and having the parental rating forms carried to parents and returned by students proved to yield the greatest return per dollar cost. This system was used in the large scale field trial.

Of the forms transmitted to parents of 4-12 grade children, 52 per cent were returned. For the parents of K-3 children, 61 per cent were returned. The number of returns at all levels K-12 were judged more than adequate to provide the desired information. Thus, this aspect of the procedure was considered satisfactory.

A second major procedural question concerned the insertion of the sample test item with each objective. Half of the survey kits which were distributed contained only objectives for the subject groups to rate, while half of the survey kits contained objectives plus a sample test item. Table 13 presents the rank order intercorrelations among objective sets

Table 9. Ranked Mean Ratings of Fifty-two Study Skills Objectives by Students, Teachers, and Parents (4-12 Grade Levels).

GROUP D

Objective (With Sample Test Item)	Students n = 34 $\bar{X}$	Rank	Parents n = 28 $\bar{X}$	Rank	Teachers n = 4 $\bar{X}$	Rank
D1	3.58	5	4.25	6*	3.50	7
D2	3.79	1	4.82	1	5.00	1
D3	3.65	3	4.25	6*	4.25	4*
D4	3.60	4	4.33	4	4.25	4*
D5	3.72	2	4.64	2	4.00	6
D6	3.38	8	4.52	3	4.75	2*
D7	3.39	6*	3.64	8	3.25	8
D8	3.39	6*	4.26	5	4.75	2*
	3.56		4.34		4.22	

Objective (Without Sample Test Item)	Students n = 47 $\bar{X}$	Rank	Parents n = 30 $\bar{X}$	Rank	Teachers n = 6 $\bar{X}$	Rank
D1	3.14	7	4.34	5	3.67	4*
D2	3.74	2	4.63	1	3.57	7*
D3	3.46	4	4.43	3*	3.67	7*
D4	3.52	3	4.23	7	3.80	3
D5	3.24	6	4.26	6	4.00	2
D6	4.04	1	3.93	8	5.00	1
D7	3.00	8	4.46	2	3.57	7*
D8	3.33	5	4.43	3*	3.67	4*
	3.43		4.34		3.87	

*indicates tied ranking

180

GROUP E

Objective (With Sample Test Item)	Students n = 35 $\bar{X}$	Rank	Parents n = 25 $\bar{X}$	Rank	Teachers n = 4 $\bar{X}$	Rank
E1	3.49	2	4.40	2	5.00	1*
E2	3.42	4	4.36	3	5.00	1*
E3	3.97	1	4.12	4	4.75	4
E4	3.43	3	4.08	5	5.00	1*
E5	3.34	5	3.92	6	4.50	5*
E6	3.03	8	3.56	9	3.00	9
E7	2.87	9	3.88	7	4.25	7
E8	3.18	7	3.80	8	3.50	8
E9	3.21	6	4.42	1	4.50	5*
	3.33		4.06		4.39	

Objective (Without Sample Test Item)	Students n = 50 $\bar{X}$	Rank	Parents n = 28 $\bar{X}$	Rank	Teachers n = 6 $\bar{X}$	Rank
E1	3.70	2	4.11	2	4.33	1*
E2	3.47	3	4.82	1	4.33	1*
E3	3.20	6	3.90	4	3.83	6
E4	3.81	1	3.93	3	4.33	1*
E5	3.35	4	3.75	6	4.00	4*
E6	3.13	7	3.62	8	4.00	4*
E7	3.02	9	3.65	7	3.50	7*
E8	3.10	8	3.50	9	3.17	9
E9	3.29	5	3.86	5	3.50	7*
	3.34		3.90		3.89	

*indicates tied ranking

GROUP F

Objective (With Sample Test Item)	Students n = 38 $\bar{X}$	Rank	Parents n = 24 $\bar{X}$	Rank	Teachers n = 4 $\bar{X}$	Rank
F1	3.56	8	4.00	7	4.00	6*
F2	4.09	2	4.71	1	5.00	1
F3	3.94	3	3.58	8	4.50	4*
F4	4.19	1	4.22	5	4.75	2*
F5	3.83	4	4.50	2	3.00	9
F6	3.42	9	3.21	9	3.25	8
F7	3.82	5	4.43	4	4.50	4*
F8	3.56	7	4.48	3	4.75	2*
F9	3.64	6	4.12	6	4.00	6*
	3.78		4.14		4.19	

Objective (Without Sample Test Item)	Students n = 54 $\bar{X}$	Rank	Parents n = 34 $\bar{X}$	Rank	Teachers n = 6 $\bar{X}$	Rank
F1	3.22	6	4.03	5	3.50	6*
F2	4.02	1	4.67	1	4.33	1
F3	3.13	9	3.53	8	4.00	2*
F4	3.75	2	4.24	3	3.57	5
F5	3.14	8	4.06	4	4.00	2*
F6	3.57	3	3.12	9	3.17	8*
F7	3.20	7	4.33	2	3.83	4
F8	3.53	4	3.75	7	3.17	8*
F9	3.29	5	4.00	6	3.50	6*
	3.43		3.97		3.67	

*indicates tied ranking

GROUP G

Objective (With Sample Test Item)	Students n = 36 $\bar{X}$	Rank	Parents n = 33 $\bar{X}$	Rank	Teachers n = 6 $\bar{X}$	Rank
G1	3.83	4	4.42	6	3.67	6
G2	3.82	5	4.55	2	4.67	1*
G3	3.53	7	4.68	1	2.33	9
G4	4.03	2	4.48	4	4.00	4*
G5	3.92	3	4.52	3	4.67	1*
G6	3.63	6	4.21	8	3.33	8
G7	3.23	9	3.91	9	3.50	7
G8	4.29	1	4.33	7	4.50	3
G9	3.35	8	4.45	5	4.00	4*
	3.74		4.39		3.85	

Objective (Without Sample Test Item)	Students n = 35 $\bar{X}$	Rank	Parents n = 26 $\bar{X}$	Rank	Teachers n = 4 $\bar{X}$	Rank
G1	3.18	4	4.40	1*	4.25	4*
G2	2.85	9	4.35	3	4.50	2*
G3	3.29	2	4.16	4	3.25	8
G4	3.09	5	4.08	5	3.50	7
G5	2.94	8	3.96	6	4.50	2*
G6	3.24	3	3.79	7	4.00	6
G7	3.03	6	3.67	8	3.00	9
G8	3.45	1	4.40	1*	4.75	1
G9	3.00	7	3.56	9	4.25	4*
	3.12		4.04		4.00	

*indicates tied ranking

GROUP H

Objective (With Sample Test Item)	Students n = 32 $\bar{X}$	Rank	Parents n = 29 $\bar{X}$	Rank	Teachers n = 6 $\bar{X}$	Rank
H1	4.09	1*	4.45	2	3.67	3*
H2	4.09	1*	4.48	1	3.83	2
H3	3.40	7	3.34	8	2.67	8
H4	3.93	4	4.14	4	3.67	3*
H5	3.77	6	3.69	6*	3.57	5*
H6	4.00	3	4.38	3	3.57	5*
H7	3.67	5	4.07	5	4.50	1
H8	3.03	8	3.69	6*	3.57	5*
	3.75		4.03		3.63	

Objective (Without Sample Test Item)	Students n = 38 $\bar{X}$	Rank	Parents n = 22 $\bar{X}$	Rank	Teachers n = 5 $\bar{X}$	Rank
H1	2.95	2	4.43	1	3.80	7
H2	3.37	1	4.14	5	4.40	2*
H3	2.41	8	3.41	8	2.80	8
H4	2.86	3	3.91	7	4.60	1
H5	2.81	4	4.32	3*	4.20	4*
H6	2.65	5*	4.32	3*	4.40	2*
H7	2.65	5*	4.33	2	4.20	4*
H8	2.58	7	3.95	6	4.20	4*
	2.79		4.10		4.08	

*indicates tied ranking

GROUP J

Objective (With Sample Test Item)	Students n = 32 $\bar{X}$	Rank	Parents n = 24 $\bar{X}$	Rank	Teachers n = 6 $\bar{X}$	Rank
J1	3.70	6	4.00	5	4.50	1*
J2	3.34	9	4.08	4	2.50	9
J3	4.06	1	4.38	3	4.50	1*
J4	3.97	3*	3.77	7*	3.00	7*
J5	4.03	2	3.78	6	3.57	5
J6	3.97	3*	4.43	2	3.17	6
J7	3.63	7	3.77	7*	3.00	7*
J8	3.93	5	4.77	1	4.00	4
J9	3.53	8	3.68	9	4.33	3
	3.80		4.07		3.62	

Objective (Without Sample Test Item)	Students n = 41 $\bar{X}$	Rank	Parents n = 31 $\bar{X}$	Rank	Teachers n = 5 $\bar{X}$	Rank
J1	3.59	2	4.55	2	4.80	1
J2	2.75	8	3.68	8	2.20	9
J3	3.56	3	4.71	1	4.40	2*
J4	2.63	9	4.39	3	3.20	8
J5	3.13	4	3.55	9	4.20	4
J6	2.92	7	3.93	6	3.40	7
J7	3.08	5*	3.90	7	3.80	5
J8	3.08	5*	3.97	5	3.60	6
J9	3.91	1	4.31	4	4.40	2*
	3.18		4.11		3.78	

*indicates tied ranking

Table 10. Rank Order Intercorrelations Among Objectives by Students, Parents, and Teachers (4-6 Grade Levels).

	Student/ Parent	Student/ Teacher	Parent/ Teacher
Objective Set D			
With sample test items	.48	.15	.67
Without sample test items	-.29	.30	-.90
Objective Set E			
With sample test items	.62	.83*	.75*
Without sample test items	.82*	.85*	.77*
Objective Set F			
With sample test items	.47	.55	.42
Without sample test items	.25	-.11	.63
Objective Set G			
With sample test items	.15	.56	.28
Without sample test items	.38	-.14	.47
Objective Set H			
With sample test items	.95*	.59	.67
Without sample test items	.40	.43	.09
Objective Set J			
With sample test item	.32	.35	.15
Without sample test item	.36	.97*	.50

*significant at $p < .05$ level

Table 11. Ranked Mean Ratings of Twenty-five Study Skills Objectives by Students, Parents, and Teachers (7-12 Grade Levels).

GROUP M

Objective (With Sample Test Item)	Students n = 37 $\bar{X}$	Rank	Parents n = 16 $\bar{X}$	Rank	Teachers n = 4 $\bar{X}$	Rank
M1	3.35	2	3.93	7*	4.75	1*
M2	3.00	6	3.93	7*	3.50	7*
M3	3.03	5	4.13	3*	4.00	6
M4	3.22	4	4.00	5	4.50	3
M5	2.89	8	3.94	6	4.25	4*
M6	2.97	7	4.13	3*	4.75	1*
M7	3.33	3	4.44	2	3.50	7*
M8	3.38	1	4.63	1	4.25	4*
	3.14		4.14		4.19	

Objective (Without Sample Test Item)	Students n = 27 $\bar{X}$	Rank	Parents n = 13 $\bar{X}$	Rank	Teachers n = 3 $\bar{X}$	Rank
M1	3.89	2	4.00	4	3.33	8
M2	2.44	8	3.46	7*	4.00	4*
M3	3.46	5	3.54	6	3.67	7
M4	3.96	1	4.15	3	4.33	2*
M5	3.74	4	3.46	7*	4.00	4*
M6	3.23	7	4.25	2	5.00	1
M7	3.41	6	3.62	5	4.00	4*
M8	3.77	3	4.31	1	4.33	2*
	3.49		3.85		4.08	

*indicates tied ranking

GROUP N

Objective (With Sample Test Item)	Students n = 38 $\bar{X}$	Rank	Parents n = 15 $\bar{X}$	Rank	Teachers n = 4 $\bar{X}$	Rank
N1	3.10	5	3.80	5	4.00	4*
N2	3.27	3	4.01	3	4.00	4*
N3	3.05	6	3.67	7	4.50	1*
N4	3.53	1	4.33	1	3.50	7
N5	2.70	8	3.73	6	4.00	4*
N6	3.46	2	4.20	2	4.50	1*
N7	2.79	7	3.60	8	3.25	8
N8	3.19	4	3.86	4	4.25	3
	3.14		3.90		4.00	

Objective (Without Sample Test Item)	Students n = 28 $\bar{X}$	Rank	Parents n = 16 $\bar{X}$	Rank	Teachers n = 3 $\bar{X}$	Rank
N1	3.18	1	3.88	1*	4.33	2*
N2	3.04	3*	3.87	3	4.33	2*
N3	2.39	8	3.38	8	2.67	8
N4	3.00	5	3.63	6	3.67	5*
N5	2.67	7	3.40	7	3.67	5*
N6	3.14	2	3.88	1*	4.33	2*
N7	3.04	3*	3.81	4	3.67	5*
N8	2.96	6	3.69	5	4.67	1
	2.93		3.69		3.92	

*indicates tied ranking

GROUP P

Objective (With Sample Test Item)	Students n = 43 $\bar{X}$	Rank	Parents n = 17 $\bar{X}$	Rank	Teachers n = 4 $\bar{X}$	Rank
P1	2.69	9	2.88	9	3.50	8
P2	4.30	4	4.18	6	4.50	1*
P3	3.74	1	4.71	2	4.50	1*
P4	3.14	7*	3.41	8	3.25	9
P5	3.57	3	4.63	3	4.25	4
P6	3.65	2	4.76	1	4.50	1*
P7	3.30	5	4.47	4	4.00	5*
P8	3.14	7*	3.65	7	4.00	5*
P9	3.17	6	4.24	5	4.00	5*
	3.41		4.10		4.06	

Objective (Without Sample Test Item	Students n = 24 $\bar{X}$	Rank	Parents n = 13 $\bar{X}$	Rank	Teachers n = 3 $\bar{X}$	Rank
P1	2.00	9	3.00	9	2.67	9
P2	3.04	5	3.85	5	3.00	7*
P3	3.79	1	4.46	1	4.67	1*
P4	2.82	6	3.31	8	3.00	7*
P5	2.79	7	3.75	6	3.67	4*
P6	3.75	2*	4.15	3	3.67	4*
P7	2.78	8	3.91	4	4.67	1*
P8	3.75	2*	3.54	7	4.00	6
P9	3.63	4	4.23	2	4.67	1*
	3.15		3.80		3.78	

*indicates tied ranking

Table 12. Rank Order Intercorrelations Among Objectives by Students, Parents, and Teachers (7-12 Grade Levels).

	Student/ Parent	Student/ Teacher	Parent/ Teacher
Objective Set M			
With sample test items	.37	.08	-.13
Without sample test items	.39	-.11	.54
Objective Set N			
With sample test items	.93*	.15	.14
Without sample test items	.96*	.53	.75*
Objective Set P			
With sample test items	.93*	.88*	.75*
Without sample test items	.69*	.39	.84*

*significant at $p < .05$ level

by subjects relating rankings of objectives with sample test items to those without sample test items. In other words, parent rankings of objectives without sample test items are correlated with the parent rankings of objectives with sample test items.

As can be seen, only eight of the 33 correlations were significant at the $p < .05$ level. There are probably two major reasons why significant correlations were not obtained. First, if the range within which all the mean ratings are operating is very small, then even small differences due to chance variability could cause ranking changes and this, in turn, could yield low correlations. Looking at the means presented in Tables 7, 8, and 9 shows that 80 per cent of all these means fall within the 3.50 to 4.50 range. This suggests that even small variations due to chance could change the relative ranking of an objective enough to cause non-significant correlations. As an example, we can examine mean ratings by students for the D set of objectives:

Objective	Mean Ratings and Rankings (in parentheses) With sample test item	Without sample test item	Difference
D1	3.57 (5)	3.14 (7)	.43
D2	3.79 (1)	3.74 (2)	.05
D3	3.65 (3)	3.46 (4)	.21
D4	3.60 (4)	3.52 (3)	.08
D5	3.72 (2)	3.24 (6)	.48
D6	3.38 (8)	4.04 (1)	.66
D7	3.39 (6)	3.00 (8)	.39
D8	3.39 (6)	3.33 (5)	.06

The difference for any single objective appears to be relatively small, but as can be seen by looking at Table 13, the rank order correlation for this particular set of data was only .09. Looking at the means and their difference for Objective D6 reveals that a difference of .66 on a five point scale caused this particular objective to be the lowest ranked objective when coupled with a sample test item and the highest ranked objective when the sample test item was omitted. Again, this may be explained by the very small range (3.00 to 4.04) within which all the means fell.

Table 13. Rank Order Correlations Among Objectives With and Without Sample Test Items by Students, Parents, and Teachers.

Objective Set	Students	Parents	Teachers
A		.47	.70*
B		.35	.27
C		.54	.15
D	.09	.17	.13
E	.78*	.78*	.81*
F	.10	.73*	.26
G	.22	.22	.80*
H	.58	.47	.33
J	.01	.04	.89*
M	.50	.64	.28
N	.36	.33	.24
P	.52	.80*	.36

*significant at $p < .05$ level

A second major factor contributing to the non-significant correlations found in Table 13 seems to have been the sample test item itself. Looking at the differences of mean ratings with and without sample test items revealed some gross differences. If we take the mean rating for an objective with sample test item and subtract the mean rating for the same objective without the sample test item, then perform this operation for every objective in the survey, we get a range of 1.60 to -.85 (where a minus difference indicates that the mean rating for the objective without sample test item was higher than the mean rating for the same objective with a sample test item.) The large differences, which appear much greater than those which chance would introduce, are best explained by looking at the content of the objective and/or the sample test item.

Including a sample test item with the objective to be rated can have one of two effects, if it causes any effect at all. It can cause the mean rating of the objective to be increased or decreased. It can possibly increase the mean rating by clarifying an objective which otherwise would be unclear. It can possibly decrease the mean rating by introducing complications, such as very technical language, which otherwise are not in the objective.

Assuming that large differences in mean ratings between objectives with and without sample test items are caused by the items themselves, a separate content analysis was completed. Those seven objectives which had the largest positive differences in means (meaning the objective with sample test item) as rated by parents and students were randomly mixed with the objectives and have the six largest negative differences (the objective without sample test item had the higher rating). Members of the project staff were then asked to determine which way the objective would receive the higher rating, with or without sample test item, and why.

The results of this analysis proved to be inconclusive. In only three of the cases was the staff able to unanimously predict in which form the objective would receive the higher rating. In five of the remaining ten cases, 50 per cent or more of the staff were unable to correctly predict which form would receive the higher rating.

An examination of the objectives and the sample test items failed to yield any obvious differences between those which were correctly predicted and those which were not.

Looking at all the sets of objectives A through P, we find in every case where there is a statistically significant difference in the average mean rating for the entire set of objectives by rating group (students or parents), the difference was positive, that is, the objective set with sample test

items had a higher average rating than did the set without sample test items. This may indicate that the inclusion of sample test items tends to cause higher ratings.

A part of the field trial design involved using classes with differing socioeconomic backgrounds. Objective sets D, E, F, G, H, and J were all formed by random selection from the same IOX objective collection (the Study Skills section of the 4-6 Reading Collection). Objective sets D, E, and F were distributed to classrooms which were composed of students mainly from middle and upper class English speaking backgrounds. Sets G, H, and J were distributed to classrooms composed mainly of students with Spanish speaking backgrounds.

For the student populations which rated G, H, and J, the differences in the means for each objective with and without sample test items were, with one exception, positive. These positive differences were high; 19 of the 26 means differed by .50 and above. In sets D, E, and F, the differences were in both the positive and negative directions, but only five of the 26 had an absolute value of .50 or greater. This may indicate that the sample test item has a greater positive effect (e.g., may clarify the objective) when the population rating the objective has a language background differing from that used in the objective.

Controlling the Quality of Test Items

In addition to the more general task of evaluating the quality of the instructional objectives developed during the project, there was the problem of developing measuring procedures which adequately assessed these objectives. Two lines of attack on this problem were employed during the project. First, we employed an *a priori* strategy including the production of careful specifications for item writers. Second, several *a posteriori* approaches were tested that involved the use of tryout data secured after the items had been developed and administered to appropriate learners. The final two sections of the chapter will examine both of these lines of endeavor.

A Domain-Referenced Strategy*

The techniques of universe-defined testing described by Osburn** and, more popularly, those of domain-referenced achievement testing set forth by Hively*** assumed a central role in the process of test item construction during latter phases of the project. It was recognized that regardless of the specificity with which an instructional objective is stated, it is often difficult for an educator to examine an objective and translate it into a test item to be used with students in such a way as to preserve the original intent of the objective-writer. As will be seen, basic to the developmental process during the project was the notion of an item form as an essential step in the translation of a measurable instructional objective into a set of test items useful for assessing the attainment of that objective. It is the purpose of this section of the report to define in understandable terms the concepts associated with "universe-defined" and "domain-referenced" testing and to demonstrate the application of these notions to the quality control activities of the project.

General Approach of Domain-Referenced Testing. Domain-referenced testing is based on the notion that a test should constitute a sample extracted from the set of all things that an "expert" in a particular area or subject should be able to do. In its original form, the technique was associated solely with achievement testing of cognitive behaviors, most notably in the area of mathematics. It will be seen, however, that the techniques may conceivably be applied to affective behavior as well.

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*This section of the report is drawn with permission from a technical paper by Judith Safford, Defining Item Forms for Use With Instructional Objectives, Instructional Objectives Exchange, October, 1970.

**Osburn, H. G. "Item Sampling for Achievement Testing." Educational and Psychological Measurement, V. 28 (Spring, 1968), pp. 95-104.

***Hively, Wells, Harry L. Patterson and Sara H. Page. "A 'Universe-Defined' System of Arithmetic Achievement Tests." Journal of Educational Measurement, V. 5 (Winter, 1968), pp. 275-290.

As Hively* conceives of domain-referenced achievement testing, one may specify finite sets or domains of test items by means of which certain aspects of an "expert's" behavior may be exhaustively defined. Testing systems referenced to these domains may then be implemented simply by sampling (randomly) items from the domain and administering them to the individuals under observation. The respondent's score on this sample of items is believed to yield an estimate of the probability that he could answer any given item from the domain.

Osburn states that the basis for generalization from a respondent's score on an achievement test to some explicitly defined universe of content must be inherent in the "procedures used for generating and sampling items,"** and that we cannot rely on factor analysis or item analysis to determine the validity of an item. He further states that a "universe-defined test" is:

> "...a test constructed and administered in such a way that an examinee's score on the test provides an unbiased estimate of his score on some explicitly defined universe of item content. This implies that (1) all items that could possibly appear in the test should be specified in advance, and (2) the items in a particular test should be selected by random sampling or stratified random sampling from the universe of content."#

Conceivably, the techniques of domain-referenced testing can be equally useful in the construction of tests to assess affective behaviors, although few, if any, precedents of such a use exist. In this case, the "expert" becomes, rather, our "ideal," the person who possesses the most desirable (by definition of the test developer) characteristics indicative of a particular attitude. Clearly, in the case of affective measures, there is considerable leeway for value judgments of the test developer to enter into the test construction process, as opposed to cognitive measures where, for example, in the decision of what constitutes an "acceptable" response to a two-place addition problem such value judgments are not involved.

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*Hively, Wells. "Introduction to Domain-Referenced Achievement Testing." Unpublished working paper, University of Minnesota, December, 1969.

**Osburn, H. G. op. cit., p. 96.

#Ibid.

Implementing Domain-Referenced Procedures. The construction of measuring instruments to assess student attainment of specified instructional objectives, in both the cognitive and affective domains, lends itself to domain-referenced techniques. The developmental process during the project began with the specification of a measurable objective; subsequently, test items to measure the objective were devised and validated through content validity judgments. That is, an individual item was considered valid if it was judged to be consonant with the intent of the objective.

Item Forms. Central to the techniques of domain-referenced test construction is the notion of an item form. In essence, the item form consists of all the specifications and restraints necessary to generate a pool of homogeneous test items to assess a given objective. Given an explicit item form, it should be possible for diverse persons to write items which would measure identical dimensions of behavior and content.

During the project, the developmental process was to include, following the specifications of an objective, the creation of one or more item forms which more clearly specified the parameters of the objective. In general, the attempt was made to state objectives with sufficient specificity so as to exclude the need for multiple item forms. However, if more than one item form might conceivably be associated with an objective, it was perfectly acceptable to use both to assess learner attainment of the objective. Such item forms were to be written so as to be of potential use to other staff members and, possibly, to users of the materials as well.

Components of an Item Form. Various definitions of item form components exist, largely in proportion to the number of persons who have written on the topic of item forms analysis. It would appear that the following delineation of components, which represents a synthesis from several sources,* might be found most useful within the framework of the project. (Examples of each component, in both an affective and a cognitive framework, are presented later in the chapter.) For our purposes, an item form might be expected to include:

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*See, for example, Hively, Wells, op. cit., and Nitko, Anthony J., "Some Considerations When Using a Domain-Referenced System of Achievement Tests in Instructional Situations," a paper presented to the annual meeting of the American Educational Research Association, Minneapolis, March, 1970.

1. Instructions to Students. Any instructions other than those specified within the item itself should be specified exactly as they will be presented to the students. This includes directions for recording responses, etc.

2. Stimulus Limits. The domain or universe from which test stimuli (i.e., item content) may be legitimately extracted should be precisely defined by specifying (a) a fixed syntactical structure, and (b) one or more replacement sets of variable elements. It is felt that in some cases syntactical idiosyncracies among items may alter the way in which those items are interpreted by respondents. Thus, as far as is possible, items should conform to a specified syntax. The explication of replacement sets is one of the most difficult aspects of defining an item form, and will be discussed at greater length in a later section.

3. Response Limits. The mode in which the student is required to respond should be described. This should include a specification of whether a selected or constructed response is to be required, and a statement regarding the classes of alternatives presented in the case of selected response items, or any criteria given to the student to guide him in constructing responses.

4. Scoring Criteria. The manner in which numerical values are to be associated with each possible student response should be specified. That is, a definition of the "correct" response or, in some cases, degrees of "correctness" of response alternatives, should be provided.

Devising Item Forms. Essential to the construction of an item form is the specification of an instructional objective stated in terms of measurable learner behavior; it is only in relation to such an objective that an item form serves a useful purpose. As has been mentioned, the attempt should be made, for purposes of simplicity, to state objectives with sufficient specificity and clarity that a single item form may be inferred. However, if such clarity is not deemed possible or defensible, more than one item form may be associated with a single objective.

Specifying the sets of replacement variables is clearly the most difficult, and crucial, step in developing an item form. For purposes of clarity, it seems reasonable that we first delineate the variable elements in the item form, and then devise a syntactical structure to accomodate these variables.

Typically, the longer a staff discussion aimed at identifying variables continues, the greater the number of variables which are identified; somewhere a point must be established -- in practice, often arbitrarily -- beyond which we will complicate our item form no further. It is much more efficient to develop a second objective and corresponding item form than to include a multitude of variable elements in a single item form. This is especially true when these variables exist in infinite rather than finite sets, as will be seen.

Several examples of detailed item forms exist in the literature.* An examination of these reveals that in all cases, finite sets of replacement variables are specified. Thus, by combining the variable elements in all possible ways, it is possible to develop a pool of items which exhaustively measures the objective; no further items may be conceived within the confines of the item form. This exhaustiveness is, in fact, central to Hively's definition of domain-referenced testing.

It is conceivable, however, that we may wish to utilize domain-referenced procedures in instances where such thorough explication of variable elements is not possible, feasible, or desirable. In such instances, we may wish to describe these variables in terms of infinite rather than finite sets. It is felt that with careful explication of the specifications which potential variable elements must meet in order to qualify for inclusion in these infinite sets, such cases can be treated in light of domain-referenced procedures.

Clearly, the employment of infinite sets of variable elements in an item form reduces the generalization which can be made from a respondent's performance on a sample of the test items to his behavior regarding the universe of items. To construct the universe of items from which to sample, an infinite number of items would be required -- obviously an impossible feat. We must, therefore, content ourselves with a somewhat more ambiguous -- though useful, nonetheless -- estimation of the respondent's performance on the infinite body of possible items.

We could, of course, easily extinguish this ambiguity by arbitrarily reducing the universe of content under consideration to a finite set, that is, by specifying those instances of the variable in which we shall be interested and eliminating all other possible instances. In some instances, this alternative may seem defensible and should be taken, as the clarity of the resulting set of test items is clearly enhanced. In other cases, however, it is felt that such a limitation might, in fact, allow the biases of the staff to play an in-

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*Hively, Wells, et al., op. cit.
Also, Nitko, Anthony J., op. cit.

ordinately strong role in the item development. It is then more defensible to define the content more generally, that is, in terms of an infinite set, and to provide items which are representative of this content domain but which make no claim to comprise an exhaustive pool. The user should certainly be free to add further items which he feels to be equally representative of the universe of content in question, thereby rendering the generalization based on the item pool perhaps a mite less ambiguous.

Examples of Item Forms. Two item forms, one in the cognitive and one in the affective domain, are offered here merely for purposes of clarification regarding the components of an item form in the two cases.

I. Cognitive

Objective: Given a three-syllable word, the student will divide the word into syllables and mark the accented syllable.

Instructions to Students: Divide each word into syllables and mark the accented syllable.

Syl·ves''·ter

Stimulus Limits

Syntactical Structure: A list of ten three-syllable words is provided.

Replacement Set: any three-syllable word

Response Limits: Students will respond as in example in Instructions to Students.

Scoring Criteria: Correct response is one in which all syllabication and accent is correctly marked.

The above example, though simplistic for purposes of clarity, includes a replacement set which is, for all practical purposes, infinite.

II. Affective

Objective: The student will respond to hypothetical situations in such a way as to indicate agreement with the behaviors of hypothesized persons which

reflect tolerance of another's values and opinions, and disagreement with behaviors reflecting intolerance.

Stimulus Limits

Syntactical Structure: In situation (a), a person (P1) with value (B1) encounters another person (P2) expressing value (B2). (P1) exhibits behavior (C) toward (P2). Do you agree with the behavior of (P1)?

Replacement Sets:

A = {any hypothetical situation judged to be within the realm of experience or comprehension of a majority of students in grades 7-12.}

B = {social, educational, religious, aesthetic, cultural, and economic/political values and opinions, such that the value or opinion is neither illegal nor in violation of generally agreed upon societal sanctions}

C = {positive and negative instances of the following behavioral indicators of tolerance:

(1) admits P2 into physical proximity
(2) remains in physical proximity of P2
(3) attends willingly to P2
(4) engages in minimal social interaction with P2
(5) avoids judging P2 on basis of value being expressed
(6) avoids stereotypic judging of other members of P2's group on basis of value being expressed by P2
(7) avoids judging of P2 on basis of stereotypes of other members of P2's group
(8) expresses respect for P2 as a human being regardless of the value being expressed
(9) approaches P2 to better understand the value being expressed
(10) refrains from interfering with P2's right to express the value}

P1 = {hypothetical person responding positively or negatively to P2's value expression}

P2 = {hypothetical person expressing divergent value or opinion, either verbally or via nonverbal behavior}

Response Limits: Possible responses = strongly agree, agree, disagree, strongly disagree. Students will select one response per situation to indicate the degree to which they condone the behavior of P1.

Scoring Criteria: For items reflecting tolerance (positive instances of the variables in Set C), responses will be scored: strongly agree = 4, agree = 3, disagree = 2, strongly disagree = 1. In items reflecting intolerance (negative instances of the variables in Set C), responses will be scored: strongly agree = 1, agree = 2, disagree = 3, and strongly disagree = 4.

Two sample items are offered as further explanation of how the affective item form might be implemented:

> In an American government class, the teacher wants his students to hear both sides of a local campaign issue. He invites representatives from both camps to speak to the class. Some of the students dislike this idea, as one of the positions they feel is clearly in violation of the public interest. Because the teacher is unwilling to change his plans, these students simply do not attend class on the day in which the speakers make their presentations. Do you agree with the behavior of the students?

> A girl is walking down the street and passes by a man handing out literature on a corner. She notices that the man is wearing garments of an orthodox religious group with which she is only vaguely familiar, so she accepts the literature in order to learn more about the group. Do you agree with the behavior of the girl?

In this example, the instances of tolerant/intolerant behavior were reduced to a finite set (B) of variables. However, the sets (A) and (C) were left as infinite sets, for it was felt that an attempt to reduce them to finite sets would involve the imposition of the values of the writer upon the resulting set of test items, thereby rendering the items less justifiable and of less utility to a diversity of users.

Utility of Item Forms. The specification of item forms provides a link between objective and test items necessary to the effective communication of the intent of the objective and to its translation into an instrument which will provide a reliable measure of the objective. Such a link is in-

valuable to the development of tests based on criterion-referenced measurement techniques, where content validity plays a strong role, that is, when an individual item's validity is determined not by statistical procedures but rather by its judged concurrence with the objective. The detailed specification of an item form as an intermediate step in the translation of objectives into test items renders the content validity judgment an objective, rather than subjective, operation.

It is expected that the clear specification of item forms will be of increasing utility to staff members of objectives bank agencies in developing specialized functions. The item form enables the conceiver of an objective to communicate his intent to other staff members in such a way that these members can then engage in a systematic process of writing test items to measure the objective. Were such explicit communication not possible, it would be necessary that the staff member who originally conceived the objective would be required to perform the entire task of item writing himself.

A further potential use of the item forms is to the user. Nitko is but one of many who state that although it is often recommended that a sample item be provided with an objective, it may be more useful if the objective were accompanied by one or more item forms "which clearly specify the domain of tasks that are implied by the objective."* In accordance with this view, an objectives bank agency could serve not as a "test developing organization" as this is usually understood, but might provide prototype items pertinent to affective and cognitive objectives from which the user may select, as well as item forms and generation rules to enable the user to expand the pool of relevant test items to assess an objective. The user interested in more than one objective might be more willing to combine items from several objectives into a single instrument than he would if well-defined instruments were provided. In this way the resources provided by the objectives bank agency may be maximally useful to a variety of potential users.

An Empirical Approach**

An alternative attack on this problem may be to develop the test items with whatever generation rules are available, then

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*Nitko, Anthony, op. cit., p. 2.

**This final section of the chapter is based on a Symposium Presentation at a Joint Session of the National Council for Educational Measurement and the American Educational Research Association, March 2-6, 1970, Minneapolis, Minnesota.

try the items out to discover empirically which items are defective, that is, are not congruent with the criterion. A better way to put it might be to say that we wish to discover defective item forms, namely, those which permit the generation of incongrous items.

In an attempt to devise some indicators of item adequacy (or item form adequacy) on the basis of empirical tryout data, two sets of test items and data resulting from their use were scrutinized at some length. The first was a group of criterion-referenced test items developed to assess the effectiveness of an instructional program used at the Southwest Regional Laboratory for Educational Research and Development (SWRL). The second was a collection of test items used in an instructional methodology class at UCLA. The remainder of this chapter will report the data, some analyses, and some speculations regarding both of these sets of items.

Instructional Concepts Program Test Items. The first test items used were constructed to assess the effectiveness of the SWRL Instructional Concepts Program, a sequence designed to teach preschool children certain conceptual skills required in academic tasks. The rationale and effectiveness of of the program are described elsewhere.*

In all, there were 35 test items representing seven different program objectives, five items per objective. Each item consisted of a flashcard coupled with oral directions. The flashcard contained one illustration of the concept being tested and either one or two distractors. A child would be told, "Point to the green bird," and was then obliged to select the correct illustration. With the exception of four two-choice items, all items were of a three-choice form.

These items were administered on a pre- and post-instruction basis to 133 kindergarten children from low income San Diego and Santa Paula families during 1968-1969. A 15 week instructional program was under analysis and the identical items were given as a pretest and posttest. From these 133 children, 100 were randomly selected for ease of interpretation. Their pretest and posttest data were subjected to several analyses. In each case the five item subtests were considered separately, that is, as distinct tests of five items apiece.

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*Scott, Roger O. The 1968-1969 Classroom Tryout of the SWRL Instructional Concepts Program. SWRL Development Memorandum, July 10, 1969, 22 pp.

Replicating the Cox-Vargas Analysis. An initial analysis was conducted in the same fashion as Cox and Vargas* (1966) in their attempt to contrast classical norm-referenced item analysis approaches with a procedure more consistent with criterion-referenced considerations. They ranked sets of test items according to two different indices, then computed the correlation between these two sets of rankings. Their Difference Index was computed on posttest data only, as is typically the case with norm-referenced approaches, by calculating "the percentage of students in the highest 27 per cent in total posttest score who pass the item minus the percentage in the lowest 27 per cent who pass the item." Their Pretest-Posttest Difference Index was obtained by computing "the percentage of students who pass the item on the posttest minus the percentage who pass the item on the pretest." For two different sets of items, addition and multiplication, the correlation coefficients between the two different ranking approaches were .37 and .40 respectively.

For the seven different subtests of the Instruction Comcepts Program items, the correlations between the same two ranking approaches were as follows: .70, 163, 1.00, 0, 0, .34, .90. The zero coefficicients resulted from tied ranks on the five item subsets.

A Fourfold Fantasy. Another approach that seemed promising for criterion-referenced tests used in association with an instructional sequence was to consider the particular changes which occurred with items over the 15-week instructional period. Four possibilities exist. For any learner, an item could be answered incorrectly (0) on the pretest, then correctly (1) on the posttest, and thus be designated for that individual as a 01 item. Similarly, 00, 11, or 10 responses could occur. The possible results of each of the 100 individuals completing the pretest and posttest can be represented as in Figure 2. Cell A can be thought of as the positive change cell while Cell D represents the negative change cell.

For each of the items, the percentages of individuals responding in each of these four ways were calculated. Next, items were ranked according to the highest percentage of responses in first the 01, then the 10 categories. Where overall improvement during instruction is present, as was the case with all seven subtests, the 01 category (Cell A) would

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*Cox, Richard C. and Julie S. Vargas. A Comparison of Item Selection Techniques for Norm-Referenced and Criterion-Referenced Tests. Paper presented at the annual meeting of the National Council on Measurement in Education, Chicago, Illinois, February, 1966.

Pretest	Posttest: Correct	Posttest: Incorrect
Incorrect	01 (A)	00 (B)
Correct	11 (C)	10 (D)

Figure 2. A Fourfold Table Representing Possible Pretest-Posttest Performance on Test Items.

seem to be tapping this improvement, while the 10 category (Cell D) would not seem to be reflecting it. A negative correlation between the two sets of rankings was anticipated. As can be seen in Table 14 where these data are presented, such a negative relationship was not present. Indeed, the coefficients on the seven subtests between the 01 and 10 rankings were as follows: -.10, .87, .82, 1.00, -.10, .97, -.10.

Homogeneity. Another way of analyzing the fourfold data might be to locate items which behaved aberrantly, at least with respect to most other items in a subtest. Because a common approach to the detection of such aberrance, namely, intercorrelation among test items, often fails with criterion-referenced tests because of insufficient variability in post-instruction test performance, a chi square analysis seemed to be a likely alternative. For each of the sub-tests of five items, a four by five chi square analysis could reveal the degree to which the items congealed with respect to the four options, i.e., 00, 01, 10, 11. Where significant chi square values resulted, the aberrant item(s) could be more closely scrutinized.

Unfortunately, for these seven subtests, six whopping chi square values emerged, suggesting a probably lack of utility for this approach. For the seven subtests (with 12 df) the respective chi square results were 15.5, 192.3, 109.3, 180.1, 49.8, 257.2, and 35.6. A chi square of 26.2 is required for .01 significance in this situation.

Several alternative methods of ranking the test items within subsets were tried, 13 in all. Intercorrelations among all of them were computed for each of the seven subtests (making a thicker than comfortably carried computer printout). Some of these ranking procedures proved to be redundant, correlating perfectly with others. Some proved slightly, but not meaningfully different from the four ranking schemes previously described, i.e., Cox and Vargas' two procedures plus

Table 14. Frequency distribution of correct (1) and incorrect (0) responses for pretest-posttest performance of 100 subjects based on the SWRL Instructional Concepts Program.

		Pretest-Posttest Frequencies			
Subtest	Item	01	00	11	10
I	1	8	3	88	1
	2	15	3	82	0
	3	11	1	85	3
	4	14	0	85	1
	5	21	2	75	2
II	6	18	1	77	4
	7	25	51	16	8
	8	36	11	47	6
	9	14	2	80	4
	10	44	20	27	9
III	11	17	5	71	7
	12	16	11	72	1
	13	33	16	33	18
	14	7	3	89	1
	15	11	1	86	2
IV	16	16	4	75	5
	17	12	1	87	0
	18	13	9	74	4
	19	31	45	11	13
	20	22	27	39	12
V	21	22	23	34	21
	22	35	9	52	4
	23	27	15	53	5
	24	30	12	54	4
	25	23	28	40	9
VI	26	11	2	85	2
	27	7	0	92	1
	28	26	25	38	11
	29	31	36	23	10
	30	24	61	6	9
VII	31	12	6	76	6
	32	16	8	68	8
	33	27	15	55	3
	34	18	7	71	4
	35	33	16	45	6

the 01 and 10 procedures. For example, rankings based on (1) a McNemar significance of change statistic and (2) a phi coefficient on the fourfold data did not yield any readily interpretable results. Some of the 13 ranking procedures were calculated only because the computer had been taught to dispense them.

Instructional Methodology Class Test Items. The second set of data was based upon four ten-item subtests used in a UCLA course for secondary teacher education candidates. Each of these subtests dealt with a particular facet of the topic of instructional objectives. Subtest I required students to distinguish between measurable and nonmeasurable instructional objectives. Subtest II required discriminations between objectives which did or did not possess a minimum level of acceptable performance for an individual learner. Subtest III called for discriminations between objectives which did or did not possess a minimum level of acceptable performance for a group of learners. Subtest IV presented a series of objectives which were to be classified according to the taxonomy of educational objectives as primarily (a) affective, (b) psychomotor, (c) cognitive-lowest level, or (d) cognitive-higher than lowest level. Thus, Subtests I, II, and III consisted of binary choice items while Subtest IV was composed of four alternative multiple choice items.

The four subtests were administered as part of a pretest at the beginning of a UCLA course during the Fall, 1969 quarter, again as a part of the midterm examination in the course five weeks later, and as a part of the final examination in the course still five weeks later. The principal instruction regarding these four topics occurred prior to the midterm exam, but the topics were also treated intermittenly after the midterm examination. Almost 200 students were enrolled in the class. Once more, for ease of interpretation, 100 students' examinations were selected at random for use in all analyses.

Essentially, both the midterm and final examination performance of the subjects can be considered posttests. Both were used since it was anticipated that while student performance on the midterm examination would be high, there would be an even higher performance, hence less variability, on the final examination. Both situations were of interest. Thus, during the remainder of this discussion these two posttests will be referred to as the "midterm posttest" and the "final posttest."

Cox-Vargas Replication. For each of the four subtests, the ten items were ranked on the basis of Cox-Vargas' Difference Index and their Pretest-Posttest Difference Index. These rankings were then correlated. Results for both posttests are presented in Table 15.

Table 15. Correlations between Cox-Vargas' Difference Index and Pretest-Posttest Difference Index for 100 subjects' performance on four ten-item instructional methodology subtests.

	Midterm Posttest	Final Posttest
Subtest	r*	r*
I	-.37	-.34
II	-.03	-.18
III	-.23	-.02
IV	-.33	.17

*An r of .55 or more is required for .05 significance.

While none of the resulting correlations attained the strength necessary for statistical significance, it is clear from these results, as well as those of the Instructional Concepts Program data, that the two indices yield markedly disparate information regarding the adequacy of test items, particularly where the level of posttest proficiency is high.

Fourfold Results. Employing the same four cell tabulation scheme as was described earlier, the data were arrayed as seen in Table 16. Once more, correlations were computed between rankings based on frequencies in the negative change cell and positive change cell. Unsystematic correlation coefficients emerged, as can be seen in Table 17.

Homogeneity. As with the Instructional Concepts Program data, chi square analyses were computed on the eight four by ten tables representing both posttest results for the four subtests. The resulting eight chi square values were Subtest I: 48.3 and 40.5; Subtest II: 376.4 and 371.5; Subtest III: 133.3 and 96.7; Subtest IV: 183.4 and 350.6. Since a chi square value of 40 is required for .05 significance, it can be seen that all eight values proved to be statistically significant. Since with Subtest I, both regarding the midterm and final exams, the chi square values failed to achieve .01 significance, perhaps the use of this type of analysis with a stringent level of significance may prove of some utility as a gross test of the homogeneity of a set of supposedly similar test items.

Table 16. Frequency distribution of correct (1) and incorrect (0) responses for pretest-posttest performance of 100 subjects on four subtests based on a UCLA instructional methodology course.

		Midterm Posttest				Final Posttest			
Subtest	Item	01	00	11	10	01	00	11	10
I	1	20	0	80	0	20	0	80	0
	2	25	1	69	5	26	0	72	2
	3	20	0	76	0	20	0	79	1
	4	22	0	78	0	22	0	78	0
	5	14	1	83	2	15	0	81	4
	6	12	0	88	0	12	0	88	0
	7	30	0	70	0	30	0	70	0
	8	27	0	72	1	27	0	73	0
	9	24	0	76	0	24	0	76	0
	10	16	0	82	2	16	0	84	0
II	1	23	1	76	0	24	0	76	0
	2	34	10	43	8	31	13	40	16
	3	27	38	22	13	39	26	20	15
	4	57	19	16	8	73	3	22	2
	5	39	0	61	0	39	0	61	0
	6	16	0	82	2	16	0	81	3
	7	19	8	52	21	24	3	62	11
	8	36	8	53	3	37	7	43	13
	9	17	0	82	1	16	1	83	0
	10	11	3	84	2	14	0	85	1

Table 16 continued.

		Midterm Posttest				Final Posttest			
Subtest	Item	01	00	11	10	01	00	11	10
III	1	29	1	70	0	28	2	69	1
	2	51	5	42	2	55	1	42	2
	3	42	14	33	11	48	8	38	6
	4	38	1	59	2	36	3	58	3
	5	42	6	47	5	42	6	42	10
	6	35	6	50	9	38	3	57	2
	7	43	22	28	7	51	14	28	7
	8	37	4	54	5	36	5	55	4
	9	39	2	59	0	39	2	57	2
	10	24	4	66	6	24	4	65	7
IV	1	50	0	50	0	50	0	50	0
	2	62	4	33	1	65	1	30	4
	3	69	0	31	0	69	0	30	1
	4	43	2	54	1	45	0	55	0
	5	48	3	47	2	50	1	49	0
	6	69	2	28	1	65	6	29	0
	7	42	21	23	14	24	39	27	10
	8	56	2	40	2	58	0	41	1
	9	64	4	31	1	64	4	32	0
	10	63	5	29	3	66	2	29	3

Once more, a number of different schemes for ranking the test items in each set were computed and correlated with each other, as well as the several variations available from the fourfold data, e.g., the 01 and 10 frequencies. Nothing resonated.

But from this confusion one insight emerged, namely, the quest was for a readily computed red flag which, much as a

Table 17. Correlations between rankings based on 01 and 10 frequencies for the instructional methodology class test results.

	Midterm Posttest	Final Posttest
Subtest	r*	r*
I	-.07	-.19
II	.13	.27
III	.08	.15
IV	-.44	.16

*An r of .55 or more is required for .05 significance.

negative discrimination index for a norm-referenced test item, alerts the test constructor to a potentially deficient item. Now one could argue that such items are identifiable by simple inspection of the fourfold frequencies for a set of items administered on a pre- and post-instruction basis. For instance, in situations where there is some positive charge attributable to instruction, as reflected by fairly consistent pretest to posttest improvement*, then one might scrutinize data such as those in Table 16 to detect items which were behaving aberrantly. For instance, if one examines the midterm posttest results for Subtest II, then certainly items number 3 and number 7 seem to be measuring something different than most of the other items in that set. In Subtest I, on the other hand, there appear to be no particularly aberrant items. But, visual scrutiny carries with it the dangers of misperception on the part of the scrutinizer. It would be pleasant to have some easily calculated, yet reliable, index of item aberrance.

A Possibility? After considerable thought, a possible solution emerged. What we really wish to do is locate the items that behave differently from most of the items or, putting it another way, behave differently from the prototypic item. But what is the prototypic item for a set of items ostensibly measuring the same objective? Perhaps the best

*It should be emphasized that general pre- to post-instruction improvement must be occurring for this type of homogeneity analysis to make sense. Otherwise, many items which are behaving chaotically may merely be reflective of poor instruction.

estimate of such an item can be attained by computing the median values for the 01, 00, 11, and 10 cells of a four by k table such as the subsets of Table 16. The median value would not be affected by the aberrant items (as would the arithmetic mean), yet would provide some indication of how most of the items were behaving. By contrasting each item's actual fourfold frequencies with hypothetical frequencies based on the median values for each cell, we arrive at a one by four cell table which permits a chi square test with three degrees of freedom.

Such chi square analyses were computed for each of the items in the four instructional methodology class subtests. The results are presented in Table 18. An inspection of the results does suggest the possible utility of this approach, for the particularly large chi square values do seem to pick up the atypical items, even more accurately than visual scrutiny.

For example, the chi square values for the midterm data on Subtest II signalled that item number 4 was behaving more aberrantly than our visual examination had detected. Incidentally, all three items in this subtest (numbers 3, 4, and 7) were subsequently discerned to have been badly written.

Table 18. Chi square values yielded by contrasting fourfold frequencies of each item with hypothetical frequencies based on the median value of each ten-item subtest.

	Subtest I		Subtest II		Subtest III		Subtest IV	
Item	Mid	Final	Mid	Final	Mid	Final	Mid	Final
1	.8	.3	12.7	8.3	16.3	7.3	15.2	15.1
2	48.2	16.6	22.5	141.4	7.8	13.0	1.1	24.8
3	24.7	2.9	257.8	383.3	34.5	15.7	5.5	2.6
4	.7	.3	115.7	101.3	5.4	.4	19.6	24.3
5	13.4	68.7	16.1	9.3	1.3	17.7	9.6	12.9
6	6.1	5.2	19.8	13.1	4.1	.7	2.3	25.9
7	5.1	5.0	139.9	29.8	80.4	53.0	274.4	1647.5
8	2.7	2.3	6.4	65.4	.2	.9	2.7	4.9
9	1.1	.7	19.9	15.3	7.3	1.3	1.4	9.7
10	6.1	1.8	21.9	18.5	9.5	10.5	5.5	14.0

Exactly how to set the minimum limits for such chi square values is yet to be worked out, but when the value exceeds 1,000 with three degrees of freedom, as was the case for item number 7 in Subtest IV Final Posttest, then a magenta flag is clearly fluttering. There are, of course, technical considerations in the calculations of such chi square tests, e.g., expected median frequencies of zero as would occur in the Final Subtest I for the 00 cell, which may result in other, comparable analyses being employed. What is being recommended here is not this particular analysis but a general approach for producing an empirically-based index of defective criterion-referenced test items used to assess the quality of instruction.

CHAPTER 6

CLASSIFICATION ACTIVITIES*

The third goal of the project was to develop procedures for classifying and retrieving objectives and test measures. The intent of this goal was to improve upon previous practice, both within the Objectives Exchange as well as education at large, which devoted relatively little effort to the problem of grouping objectives except for minimal attention to gross subject matter areas and grade levels.

As our research soon made evident, the development of taxonomic procedures can be a very scholarly and esoteric endeavor. Our intention, however, was not to develop an academically attractive classification scheme at the expense of potential usefulness. Indeed, our efforts were almost entirely directed toward the goal of increased use of objectives and associated tests in the schools. If schools are to focus upon <u>results</u> obtained rather than on the <u>means</u> employed to achieve those results, it is, in our view, mandatory that the instructional staff identify their objectives and seek evidence whether those objectives have been met. Classification schemes pleasing in appearance and satisfying in their logical coherence but not functional were quickly rejected. This does not mean that the traditional requirements of an acceptable taxonomic systems were ignored; rather, that functionalism was the dominant necessary condition.

Our working criteria of functionalism were three in number. The primary criterion was, as stated above, whether the scheme was likely to promote widespread use of performance based indicators. The second criterion was whether objectives and measures desired by the teachers could be located within the system. The ability of the system to provide objectives and measures in addition to those the teacher could have constructed on his own was the third criteria. Thus, when we sought to construct a functional classification scheme, we attempted to develop one that would be likely to facilitate school <u>adoption</u> of performance based indicators, permit <u>retrieval</u> of desired objectives and measures, and offer <u>additional</u> objectives and measures.

Many activities of the project staff in their effort to develop the desired scheme proved less than satisfying. The many educational researchers and instructional specialists with whom we consulted provided little positive direction. Our conversations with these individuals made clear to us the enormous difficulties associated with the task.

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*This chapter is based heavily on the analytic efforts of Professor Jason Millman who, during the final months of the project's existence, coalesced our prior work regarding the classification enterprise.

The exhaustive search of the literature, including the standard references and a host of fugitive sources, proved frustrating. We were unable to isolate good leads on categorization schemes which might prove functional. Fifty classification schemes developed by graduate students as a course requirement did not seem useable. A further accounting of these unfruitful activities is contained in the December, 1969 and March, 1970 Progress Reports for this project.

In our attempt to develop a classification scheme, we divided the taxonomic problem into three activities: (a) selecting the dimensions of categorization, (b) choosing appropriate levels or subcategories for each of the selected dimensions, and (c) deciding upon the arrangement of the constituent elements. To illustrate, the project staff considered whether subject matter was a dimension to be used in the classification and, if so, into what subcategories this variable should be divided. Decisions about arrangement centered around whether a chosen dimension should be subordinate, superordinate, or equated to a second dimension. The third activity of arranging the constituent elements turned out to be closely dependent upon choice of retrieval mechanism, as will be discussed later in this chapter.

Dimensions of Categorization

In trying to decide upon their objectives, school personnel could undoubtedly benefit from having for each objective information on all the dimensions to be identified below. It certainly cannot hurt to know the level of priority given to the objective by other groups, the objective's likely "cost" in instructional time, the categories of cognitive processes into which it falls, and so forth. But for their use in instruction, objectives must be grouped. A long list of seemingly unorganized objectives (even with all kinds of designations after it) will not be very helpful.

Informal feedback regarding the utility of the present collections as described in previous chapters of this report convinced us that our initial scheme for grouping the objectives was far from optimum. Even the best intentioned teachers reported difficulty in making use of the collections of objectives. Such discussions led us to our present belief that if we are to have the objectives employed in ways which will lead the schools to focus on outcomes instead of process, on results instead of means, it will be necessary to arrange the objectives and associated test items in a far more useable form.

In part, based on our interaction with users, we also became convinced that, in order for the collections to have the impact planned, the teachers will need to be able to use them with a minimum of disruption of their present procedures.

That is, we believe that for large-scale adoption of measurable objectives and related tests, such materials must be able to be absorbed conveniently into the ongoing instructional programs of the classrooms. Typical teachers might be willing to spend five per cent of their class time in novel (to them) procedures as long as they can continue in a safe, secure, and familiar manner 95 per cent of the time. All this suggested to us the desirability of developing a classification scheme which, while fostering emphasis on product over process, would, at the same time, minimize the disruption of the teacher's instructional procedures.

Thus, the suitability of each of several dimensions as a possible basis for grouping objectives is considered below. The criteria of functionalism, as indicated above, will be employed with heaviest use of the first, the adoption criterion.

1. Subject Matter Content vs. Cognitive Process Objectives. Content objectives imply a certain subject matter of knowledge, e.g., algebra, history, peace, the dairy, homeostasis. Cognitive Process objectives imply a mental skill or operation on the part of the student, e.g., problem solving, memorizing, composing, etc.*

One could argue that most objectives have both a content (subject matter) and a process component. Thus, the attempt to categorize objectives as either subject matter or cognitive process is doomed to failure. Even if these two categories were mutually exclusive, however, they would still have a limited usefulness. Most teachers engage in specific activities which are intended to result in both subject matter learning and the development of these more general processes. They want to measure simultaneously the resultant subject matter and cognitive process learning from such activities.

2. Hierarchical vs. Free Standing Objectives. Hierarchical objectives are those for which prerequisite experience or skill is explicit and which serve as prerequisites to other objectives. Free standing objectives are those for which no prerequisite or consequent objectives are explicit.

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*These seven dimensions of educational objectives together with their initial paragraph of description were suggested by Robert Stake in personal conversation. Dr. Stake was not, however, suggesting that these dimensions necessarily be used in a classification scheme for objectives bank collections.

Many teaching activities are aimed at both hierarchical and free standing activities simultaneously. To divide objectives into these two broad groups seem to serve no functional purpose. On the other hand, if, in a group of objectives, some are prerequisite to others, then instruction might well be sequenced with due regard to such dependencies. Thus, in the classification scheme developed, attention is given to appropriate hierarchical arrangements within subgroupings of objectives.

3. General vs. Specific Objectives. General objectives are those that are capable of evaluation by many different specific observations, e.g., algebra, problem solving, fostering patriotism, developing musical talent. Specific objectives are capable of evaluation by a (possibly repeated) particular observation, e.g., knowing the capitols of the fifty states, having the children make a Valentine box. Related to the difference between General and Specific objectives is the extent to which specific behavior or conditions would conceivably be excluded from or even contrary to the objective. The objective, "to develop inquiry skills," may be so general as to suggest no observations that could not be used as evidence of pursuit to the objective. The objective, "to inquire using the scientific method into the obstacles to peace," is sufficiently specific to suggest observations that would identify irrelevant and contradictory efforts.

Although placing objectives in categories according to how general they are has virtually no utility, there is a need for objectives at several levels of generality. Krathwohl argues this point well.

> "...curriculum construction requires a process of moving through descending abstractions from very general and global statements of desirable behaviors for a program, to intermediate level statements that indicate the blocks from which the program will be constructed, and finally to quite detailed statements which spell out the sub-goals, their relation to one another, and the level of achievement which results in the successful attainment of the intermediate-level behavioral descriptions. All levels of specification of objectives are needed to guide the planning of the educational process."* (p. 85)

It seemed most important to us that we have both kinds of objectives in our collections and that the more specific ob-

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*Krathwohl, D. R. Stating Objectives Appropriately for Program, for Curriculum, and for Instructional Materials Development. The Journal of Teacher Education, 1965, 16, 83-92.

jectives should be grouped under the more general ones. This grouping, we feel, will help educators retrieve specific objectives of interest to them which, heretofore, were "lost" in the scattered arrangements of objectives used in the initial sets of collections.

4. Performance vs. Situational Objectives. Performance objectives imply a criterion behavior on the part of the student, e.g., solve an equation, evaluate a social situation, design an investigation, etc. Situational objectives imply a criterion arrangement on the part of the educator, e.g., take students on a field trip, hold a discussion on obstacles to Peace, have a clean school building, etc. Two forms of Performance Objectives are the Prespecified Criterion Objective and the Expressive Objective. In the latter, an "Artistic-creative" performance is evaluated with regard to specific criteria invoked by experts who only perceive their relevance after the performance has occurred.

This dimension would not be suitable for the project's objectives collections since situational objectives have been excluded. Behind every situational objective there are, at least implicitly, student performance objectives. We believe it important to make these performance objectives explicit and to determine whether the "criterion arrangement" has indeed produced the performances truly desired.

5. High Priority vs. Low Priority Objectives. High priority objectives are those considered by educators and others to deserve high attention and the allocation of appropriate resources. Low priority objectives are considered to deserve relatively little attention and resource allocation.

6. Value-laden vs. Value-neutral Objectives. The value-laden objective is one which is directly associated with a moral, ethical, philosophical, political, psychological, or religious value, e.g., humanistic, the Golden Rule, respect for authorities, cheating. A value-neutral objective is one which stands relatively free of such value implications.

7. Universal vs. Parochial Objectives. Universal objectives are those which are espoused by subgroups of the society and people of various philosophies and points of view with equal ardor (or disinterest). Parochial objectives are those for which the priority given by some subgroups would be greatly different from the priority given by others.

These three dimensions (i.e., 5, 6, and 7) certainly have relevance to the educator charged with making selection of

curricula and the assignment of priorities. The information is probably of less relevance to classroom teachers as they make their day-by-day decisions. In any event, although we think that grouping objectives according to one or more of these characteristics will not be very useful, we do look positively upon the notion of supplying such "acceptance" data for at least the more broadly stated objectives.

In addition to these seven dimensions, five classes or groups of dimensions have been identified.* The suitability of these variables as possible bases for grouping objectives is considered below.

1. Subject Matter. By subject matter is meant the content with which the objective is dealing. The content might be expressed in terms of the underlying structure of the discipline involved. Alternatively, objectives could be grouped not by their location in the discipline's structure but by similarity to what might be called broad goal categories. Examples of such categories include: accumulation of knowledge, adaptability, peer relationships, democratic principles and loyalty, avocational and leisure, character development, and economic and consumer efficiency. Hierarchically arranged under each broad category could be the more specific objectives which would give definition and direction to the more global goal.

Still other dimensions suggest themselves. Objectives could be organized consonant with the content of the instructional materials. Thus, for example, the textbook being used could determine the order in which the objectives would be placed. Still another option would be to order objectives alphabetically by its key words, usually thought of as nouns. This procedure is found in many retrieval systems. Perhaps the best known division is into cognitive, affective, and psychomotor areas.** Also well known is Guilford's four categories of content: figural, symbolic, semantic, and behavioral.***

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*These groupings were suggested by Jason Millman as a supplement to the dimensions proposed by Robert Stake.

**Bloom, B. S., et al. Taxonomy of Educational Objectives. Handbook I: Cognitive Domain. New York: Longmans, Green and Co., 1956.

Krathwohl, D. R., et al. Taxonomy of Educational Objectives. Handbook II: Affective Domain. New York: David McKay Company, 1964.

Simpson, Elizabeth. (Unpublished papers on the classification of psychomotor skills.) Urbana: University of Illinois.

***Guilford, J. P. Three Faces of Intellect. American Psychologist, 1959, 14, 469-479.

Subject matter has a compelling appeal as a way of thinking about grouping objectives. The instruction of most teachers is organized around content, and, if the use of the objectives is to be nondisrupting, it seems only natural that the objectives should be organized in this same way. The broad goals as described above seem less suitable than organizing objectives with more regard to the structure of the subject matter being taught.

Grouping objectives to make them consonant with the content of the instructional materials would result in the need to have as many sets of collections as there are different instructional materials. This clearly is not feasible for the objectives bank agencies to undertake at this time. Eventually, however, we hope to see all publishers of instructional materials provide instructional objectives and performance based indicators for their materials.

The key word option is most valuable as a way of retrieving objectives in which the educator is interested. Although a supplementary key word index may have utility for retrieval purposes, grouping objectives by key words does not seem a very promising approach.

For different reasons, the traditional cognitive, affective, and psychomotor division is also not seen as promising. As a three category system, the grouping is much too broad. To make use of levels within each category (e.g., knowledge, application, evaluation, etc., in the cognitive category) leads to problems of classification. One cannot properly classify an objective by level without knowing the prior history of the student, for what may be (to take an example) an application problem for one student may be merely a knowledge question for another. In addition, teachers' activities are not usually organized around levels of the Taxonomies, and thus using a collection grouped by such levels is apt to be inconvenient to the teacher and less likely, therefore, to be used in the first place. This same objection of unrelatedness can be applied to Guilford's four content categories.

2. Cognitive Processes. Examples of cognitive processes include memory and problem solving. Several ways of categorizing a cognitive process dimension have been proposed. One model divides cognitive process into acquisition, application, evaluation, and communication.* Another enumeration of the mental process is: capability of getting information about, knowledge of, capability of using this knowledge, capability of evaluating, and having a concern for.** Guilford uses the

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*Tuckman, B. W. A Taxonomy for Classifying Educationally-Relevant Behavior. U.S.O.E. Project 8-0334 Incidental Report #4. New Brunswick, N. J.: Rutgers University, April, 1970.

**Reported by Robert Stake, personal communication.

categories of cognition, memory, divergent thinking, convergent thinking, and evaluation.* Gagné's** classification of kinds of learning outcomes (in the intellectual skill area) into chains, discrimination, concrete concepts, defined concepts, rules, and higher-order rules represent still another way to organize objectives in a way not bound by the subject matter of the content.

There is a certain similarity between so-called cognitive process categories and some content categories. We do not wish to debate the appropriateness of the particular label given these dimensions. What does seem important for our discussion, however, is that the specific dimensions identified in the preceeding paragraph do not appear to present a viable way of categorizing objectives for the purpose of classroom use. The teacher does not often say, "Today I shall teach memorization skills and tomorrow I shall teach my children to have these cross-disciplinary skills," but they are most typically taught within a subject matter context.

Before dismissing cognitive process variables as a good way of grouping objectives, two remarks should be made for the record. First, many forward-looking educators are interested very much in providing instruction in cross-disciplinary skills such as problem solving, observation techniques, critical thinking, and so forth. The weakness of grouping objectives by discipline is that it does not facilitate such interdisciplinary learning. Subject matter groupings will be lacking to the extent that teachers engage in teaching cognitive processes in such interdisciplinary settings. This suggests that a search be made for instances of such teaching and, when found, to have a supplementary index in which objectives related to a particular cognitive process are identified in one place.

Second, there is an aspect of the Gagné formulation which interests us greatly and that is the one-to-one correspondence between the six learning types and a major verb which could be used to define the objective.*** This isomorphism between learning type and major verb can be a major asset to the writer of instructional objectives and helps insure that specific objectives are classified correctly. The beneficiary of the

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*Guilford, J. P. Ibid.

**Gagné, Robert. Defining Objectives for Six Varieties of Learning. AERA Cassette Series B. American Educational Research Association, Washington, D.C., 1971.

***The learning types and major verbs are: chain, reinstates; discrimination, discriminates; concrete concept, identifies; defined concept, classifies; rule, demonstrates; and higher-order rule, generates.

objectives collections are not the writers but the users, and thus this attractive feature of the Gagné approach was not seen as a strong reason for its incorporation into our categorization scheme.

3. Student Characteristics. Objectives might be organized according to the groups of students for whom they are particularly appropriate. Grade, age, and sex classifications are the most frequently used. Objectives could be grouped in terms of their suitability for students having particular interests, learning styles, or (in the case of hierarchical objectives) prerequisite experience or skills.

The existing collections within IOX, for example, make heavy use of grade categories in their organization. Every one of the collections has a grade identification on its cover. At first consideration, designation by grade level or age does seem reasonable since instruction is organized by grade and to some extent by age. We decided, however, against as heavy a reliance on grade designations as used in the past. The reason for this decision is based on our finding that different teachers teach the same objective at different grades. A third grade reading objective for one teacher is an eighth grade objective for a remedial reading teacher. An arithmetic objective dealt with in the second grade of one school is not considered until the sixth grade in another school. The teachers' perceptions of "mislabeling" of objectives by grades leads them to question the worth of the entire enterprise.

Sex as a classification variable has limited usefulness both because it would result in only two categories and because it contributes very little once the subject matter of objectives is identified.

Very sensible is the notion that if a student must have had certain "experience" or skill before he can master a given objective, then that entry capability should be identified and objectives organized accordingly. Unfortunately, it is very difficult to determine, empirically at least, what those required entry capabilities are. (We are beginning to suspect that more rare than we thought is the case in which a specific kind of prior experience is mandatory in order that an objective can be mastered.) Nevertheless, orderings are implicit in any classification scheme, and partial orderings from prior to later learnings as best as we can determine them make sense.

4. Intended Student Responses. Objectives differ in terms of the "behaviors" which are expected on the part of the student. For example, it is assumed that there are distinctive differences in the cognitive responses which require

the student to judge, to use, to know, or to refer. The cognitive process variables are sometimes constructed to indicate the possible responses on the part of the learner. The item forms* used in conjunction with given objectives specify the nature of the intended student response.

The class of variables is included for theoretical completeness rather than as a serious contender for use in a scheme for classifying instructional objectives. Although it is, of course, possible to divide objectives into mutually exclusive groups according to the kind of response intended on the part of the learner, no benefit from such a classification is evident.

5. Cost Components. This class of variables includes estimates of the resources (time, materials, money, and so forth) needed for the objective to be met -- presumably under optimum teaching conditions. Two related indices are the mean instructional time spent in order for the objective to be mastered and the difficulty level of the corresponding criterion-referended items administered after instruction.

At first consideration, cost information would seem to be a valuable attribute to know about an objective. Unfortunately, this information is most difficult to obtain in any kind of standardized sort of way. As Carroll hypothesized in another context**, the time needed to learn a task depends upon such variables as aptitude of the learner, opportunity to learn, quality of instruction, and motivation of the learner. Thus, since estimates of cost would seem to be conditioned on student characteristics and the nature of the learning environment, such information would need to be supplied together with the cost estimates. This need, in our view, seriously limits the usefulness and the viability of providing cost information.

Levels of Selected Dimensions

The above exploration of the many contending dimensions of a category scheme yielded only a few which seemed worthwhile to pursue. Each of these will be identified below, and an attempt will be made to describe appropriate levels or subcategories.

1. Subject Matter Content. The analysis above suggested that the content of the subject matter, particularly as it relates to its structure, would be a likely candidate for the principal organizing attribute in the scheme to classify instructional objectives. Attempts to describe appropriate categories in any kind of generalizable way have largely proved futile.

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*See Chapter Five for our use of item form approaches.

**Carroll, J. B. A Model for School Learning. Teachers College Record, 1963, 64, 723-733.

For purposes of helping to insure adoption and aiding retreival, it did seem important to categorize objectives into broad subject matter groupings and then into chunk-size units. Examples of broad subject matter groupings (within the so-called "communication skills" field) would include: decoding, comprehension, composition, structural analysis, and so forth. Examples of broad subject matter groupings within elementary level mathematics would include: sets, computation, skills, measurement, table and graph reading, and so forth.

By chunk-size units, we mean goals that would normally take anywhere from roughly three to thirty hours of instruction. We did not want subject matter categories that would be so narrowly defined that the objectives could normally be met in a single short session of instruction. Likewise, we did not want subject matter categories so broad that it would take a substantial fraction of a school year to accomplish them. Thirty-three chunk-size subject matter categories for the broader category of decoding skills are preceded by an * and shown in Table 19.

Table 19. Content General Objectives -- Decoding Skills

I. Discrimination

*A. Auditory Discrimination - Level A
*B. Auditory Discrimination - Level B
*C. Auditory Discrimination - Level C
*D. Visual Discrimination of Pictures, Shapes, and Letters

*II. Left to Right Reading Orientation

III. Sight Vocabulary

*A. Level A
*B. Level B
*C. Level C

IV. *A. Upper Case, Printed, 10 Letters
*B. Upper Case, Printed, 26 Letters
*C. Lower Case, Printed, 10 Letters
*D. Lower Case, Printed, 26 Letters
*E. Script or Cursive Letters, 10 Letters
*F. Script or Cursive Letters, 26 Letters

V. Recognition of Sounds and their Association with Letters

*A. Long Vowel Sounds and Vowels
*B. Short Vowel Sounds and Vowels
*C. Initial Sounds and Single Consonants - Level A
*D. Initial Sounds and Single Consonants - Level B
*E. Sounds Primarily in Medial and Final Positions and Single Consonants.

VI. Pronunciation of Words and Letter Combinations

*A. CVC and VC Words Containing a Short Vowel - Level A
*B. CVC and VC Words Containing a Short Vowel - Level B
*C. CVCe Words in Which the First Vowel is Long
*D. Consonant Blends
*E. Consonant Digraphs
*F. Vowel-Vowel Combinations - Level A
*G. Vowel-Vowel Combinations - Level B

VII. Oral Reading

*A. Proper Attention to Punctuation
*B. Clear and Distinct Enunciation
*C. Correct Pronunciation - Level A
*D. Correct Pronunciation - Level B
*E. Correct Pronunciation - Level C

Our goal was to develop a functional classification scheme and our choice of categories within subject matter groupings was made with this goal in mind. Recall that our three criteria of functionalism were: facilitates adoption, permits retrieval, and suggests additional objectives. The type of categorization as illustrated above and in Table 19 satisfies these criteria. The categories are in terms readily familiar to the teacher of the subject area under consideration and resembles the topics of his instruction. These characteristics should promote adoption and facilitate retrieval. Our intention was to have chunk-size categories such that when a teacher says, "This week I will give instruction on Topic X," he will be able to find X in a table of contents of the objectives.

We realize, of course, that our chunk-size categories yield far more objectives than a single teacher is likely to want to use -- even if he were to teach all the grades concurrently. This is intentional and compatible not only with our third criterion of suggesting additional objectives but also with a guiding philosophy of most objectives bank agencies, viz., to avoid blatant prescription and encourage selection of objectives.

2. Hierarchy. In the previous section of the report, it was deemed of little value to divide objectives into two categories, hierarchical and free standing. The point was made, however, that a classification scheme might well take into account the dependencies among objectives produced by the fact that mastery of some are prerequisite to mastery of others. How one might take cognizance of such dependencies will be considered in the next section of the report dealing with arrangement of constituent elements. As for levels or categories of the dimension (the subject of this section of the report), we perceive that one objective is or is not prerequisite to another. The problem of assigning levels to this variable does not seem to exist.

3. Generality of Objectives. It was concluded earlier in this chapter that "Although placing objectives in categories according to how general they are has virtually no utility, there is a need for objectives at several levels of generality." Thus, as was true in the case of hierarchical objectives, there is no problem with classification, just with arrangement.

4. Acceptance and Value Data. Since the categories to be used in describing acceptance and value data will not become an integral part of the classification scheme, we have not focused on appropriate levels to measure these attributes. Our inclination is to use approximately four gross levels from high to low, although we can conceive of more sophisticated indices when the data represent comparison to more objectively defined standards.

5. Cognitive Process. The conclusion was reached in the previous section that categorization by cognitive process should be a minor part of the classification scheme. When cognitive processes are used, moreover, levels or categories should be chosen which reflect those skills being directly taught by teachers. We are confident that a search for such teaching will rule out the less traditional categories (e.g., "chains") in favor of cross-disciplinary categories like problem solving.

6. Grade and Age. Grade and/or age data were the final attributes judged suitable as an integral part of the scheme to classify objectives. Using the natural grade or age categories (i.e., kindergarten, first grade, etc., or six years old, seven years old, etc.) was deemed inappropriate since objectives are taught at different grades to different age children at different schools. It did, however, seem folly to throw out grade and age designations completely since there is some consensus about appropriate placement of objectives within broad grade or age groupings. The objective, to add correctly two single-digit integer numbers, clearly does not belong in a junior high school mathematics collection.

These broad grade and age designations have not yet been selected. Individual objectives will not, however, be assigned a specific grade level or age designation. When the sheer bulk of the number of objectives require it, they probably will be divided into two or more collections with duplicate placement of those objectives which could reasonably be considered appropriately belonging to two different levels.

Consider a concrete example. Let us suppose that the decoding objectives given in Table 19 are divided among two communication skills collections differing in intended grade or age level. We anticipate having approximately 40 per cent of the objectives appear only in the lower level collection, 40 per cent appear only in the upper level collection, and the remaining (borderline) 20 per cent appear in both collections. The complete listing of chunk-size objectives as shown in Table 19 will appear in both collections, with appropriate designation of those objectives not appearing in the present collection.

Arrangement of Constituent Elements

The goal here is to arrange the objectives, identified by attributes and categories as described above, in a manner which will maximize the functionalism of the collection. That is, we seek to organize the objectives so that the classification scheme will facilitate school adoption of performance based indicators, permit retrieval of desired objectives and measures, and offer additional objectives and measures not previously in the mind of the user.

Two general approaches for organization were considered. One approach makes use of a computer retrieval system. The second approach organizes the objectives in "hard copy" (i.e., a book). First, two types of computer retrieval schemes will be considered in some detail. After pointing out the advantages and disadvantages of these schemes, the conclusion will be reached that use of such schemes is premature and that the objectives should continue to be arranged in the hard copy form. Next, an attempt will be made to abstract the general problems hindering an effective organization of objectives within the hard copy format. The rules for organizing the objectives will be specified and, in so doing, will provide a partial overview of the classification scheme developed for use by the Instructional Objectives Exchange.

Two computer schemes for arranging objectives that seemed worthy of our consideration were the Classroom Teacher Support System (CTSS)* ** and the classical computer retrieval system. The CTSS is described and evaluated in Appendix E; the classical computer retrieval system is discussed below.

The skeleton of the classical retrieval system includes a large number of elements, functions to describe the elements, and a vocabulary for making use of the functions. For our purposes, the elements would consist of behaviorally stated objectives. The functions would correspond to the dimensions discussed in a previous section of this chapter. The vocabulary identifies the levels into which each dimension is categorized.

Such retrieval systems have several advantages. First, they permit identification of all objectives meeting certain criteria specified by the user. Assuming appropriate functions are available, a user could obtain all objectives which had the words sameness, alike, discrimination, difference, discriminate, differentiate, or similarity, AND were rated for 3, 4, 5, or 6 year old children, AND were given a user acceptability rating of 3 or higher, AND/OR etc. Were all the objectives available in hard copy instead of stored in a computer, the desired objectives might well be scattered throughout several collections. That is, the way in which a user may want the objectives grouped may be different from the way they are organized in a hard copy.

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*International Business Machine Education Systems. Classroom Teacher Support System - User's Reference Manual. San Jose, California: IBM Systems Development Division, 1970.

**International Business Machine Education Systems. Classroom Teacher Support System - Coordinator's Reference Manual. San Jose, California: IBM Systems Development Division, 1970.

Second, a computer system facilitates the accumulation of a history about objectives. As user data are received, objectives can be eliminated or added conveniently, and their reported characteristics modified accordingly. Information about difficulty of teaching an objective, materials that worked well or poorly with what kind of students, needed (or unneeded) prerequisite skills, and so forth could be accumulated and made available to future users.

In contrast to computer schemes is the hard copy format in which objectives are printed in collections such as those distributed by the Instructional Objectives Exchange. Clearly, the hard copy format does not assure us that every set of objectives which users are interested in will be conveniently grouped together. Grouping objectives in ways convenient to most users, extensive use of cross-referencing, and publication of objectives in more than one grouping will assist in reducing the seriousness of this disadvantage.

Advantages of hard copy are user convenience and expense. Because of the nature of their teaching assignments, most teachers will only be interested in a fraction of the tens of thousands of possible objectives. This fraction can be bound together into one or two collections. Teachers may be willing to retrieve their objectives from such collections (if well organized) much sooner than if they had to interact with a computer.

On balance, the hard copy format was decided upon...at least for the present time. It was clear, however, that the organization of the objectives in the presently available volumes is not optimal for retrieval, given the restrictions of using the printed medium.

We believe that the collections would be in most useable form if the primary organizing dimension was subject matter which corresponded as closely as possible to the teachers' units of instruction. Examples of chunk-size units were provided in Table 1. Obviously, the very specific objectives relative to each chunk-size unit would be listed after identification of the broader objective. Thus, for example, after the more general objective, recognition of short vowel sounds and their association with the (vowel) letters (Objective V-B in Table 19), would be printed these five specific objectives:

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1. Given a word orally, the student will be able to reproduce orally the vowel sound.

   Sample Item

   Directions to student: A word will be read to you. Then give me the vowel sound the word makes:

   Read: "it"

   Answer: (oral) "ĭ"

---

2. Given an orally presented word or a picture suggesting the name of an object with a short vowel, the student will produce another word with the same vowel sound.

   Sample Item

   Directions to student: A word will be read to you. Then, when called upon, you make a word that uses the same vowel sound.

   Read: "ran"

   Possible answers: "and" or "bat"

---

3. Given a list of written words and an oral reading of those words by the teacher, the student will be able to identify orally or in writing the letters with short vowel sounds.

   Sample Item

a. Directions to student: A list of words will be read to you. Follow along on your paper and mark only the short vowels with the short vowel mark (˘) (or other marking used in instruction).

   Read: "mink rate met moon"

   Answer: mĭnk rate mĕt moon

b. Directions to student: A list of words will be read to you. Follow along on your paper. When called upon, recite the words that have the short vowel sounds only.

e.g., as above; response oral.

---

4. Given orally a monosyllabic word with a short vowel sound, the student will indicate orally or in writing the vowel letter which corresponds to the short vowel sound.

Sample Item

Directions to student: I will say a word; then you write (recite) the letter which makes the short vowel sound.

Read: "bit"

Answer: writes "i" (says "i")

---

5. Given an orally presented CVC word containing a short vowel sound, the student will be able to recognize and/or pronounce a written word having the same consonants and consonant sounds only.

Sample Item

a. Directions to student: A word will be read to you. From the list of words on your paper, draw a line through the word that has the same short vowel sound as the word I read.

Read: "but" List: bat, bet, bit, bot, but

Answer: bat bet bit bot ~~but~~

b. Directions to student: A word will be read to you which is underlined and printed right after the number 1. Then read the word printed in a box to the right.

Read: "bat" 1. bat [but]

Answer: correct pronunciation of "but"

Concern for appropriate hierarchy gets manifested in two places. First, attention is given to sequence in the arrangement of the chunk-size objectives shown in Table 19. The final arrangement of the 33 chunk-size units indicated by an * in that table represents a judicious mixture of sequence by prerequisites and sequence by similarity of content. Although natural groupings such as discrimination, sight vocabulary, and so forth are maintained for ease of location by the user, there nevertheless is an intentional and rough ordering from easier to harder skills. Thus, although there will be occasions when some teachers will want to teach some later-mentioned objectives before earlier-mentioned objectives, the general trend will be preserved.

Hierarchy also is attended to in the ordering of the specific objectives listed under each chunk-size objective. Thus, for example, care was taken in the sequencing of the five specific objectives listed above. An instructor who wished to have his students be able to recognize short vowel sounds and their association with the (vowel) letters would not be off base if he gave appropriate instruction and practice in five component skills in the order list.

It should be made clear that the orderings used are based upon a logical analysis of the subject matter. No claim is made that these orderings imply that earlier-stated objectives are prerequisite to the learning of later-stated objectives.

Cognitive processes, user acceptability data, and so forth can obviously not be conveniently superimposed in a hierarchical fashion itself on an already elaborate nesting scheme. Rather, these characteristics could be identified at the location where the objective is stated and referenced in an appendix. As an example, let us suppose that in an early childhood collection, it is believed to be advisable to identify those objectives dealing with observational skills on the part of the learner. This could be done by writing "observation" along side the appropriate objectives and by placing in the index, "observation," followed by the identification numbers of the objectives falling within that category. Except for some of the more functional categories of cognitive processes (e.g., observation, problem solving, memory) for objectives with very young learners, only a minimum of information regarding these other dimensions or classification variables is planned at this time.

Finally, for reasons cited above, use of grade and age data will be severely restricted. The grouping of objectives by broad grade/age categories has been described earlier.

Based upon the reasoning given in this chapter of the report, a decision was reached to organize the objectives in the ways described. Briefly, the principal organization will be by

subject matter content in a hierarchical arrangement with specific objectives nested within broader ones, and when convenient with objectives likely to be taught first presented before more advanced ones. Grade/age level designations will not accompany objectives (as they do in the present collections), although the separate collections will be identified as to broad grade or age levels.

A problem similar to that above occurs when a particular topic could logically appear under more than one subheading. As an illustration, some objectives dealing with tone of a piece of writing are relevant both to the analysis of literary works (comprehension, literature) and to the writing of works (composition). Another example would be graph reading skills which are often found included in the curriculum of several disciplines. When the same objectives are considered quite germane to subject matter disciplines covering more than one collection, they will be repeated in each collection. The reason for this decision was, quite simply, user convenience. On the other hand, when objectives could be placed in more than one place within the same collection, they will usually be placed in just one location and cross referenced in the other locations.

One valuable byproduct facilitated by the classification scheme comes immediately to mind. Since the specific objectives will be grouped under broader chunk-size objectives, it would be relatively easy to construct criterion-referenced tests of these somewhat more content general objectives. Such tests would often consist of items similar to those used as sample items for the specific objectives. Two "parallel" forms of such criterion-referenced tests might be constructed either to permit the opportunity for assessing pre-instruction, post-instruction gain or for retesting of students who "failed" the test the first time and who were given remedial instruction. Since there will not be an opportunity for an empirical check that the forms are indeed parallel and thus they may be of somewhat unequal difficulty, the validity inferences about change in scores is not insured. Nevertheless, use of these tests as a guide to instruction would represent such a quantum jump in accountability that we could, in all good conscience, recommend their use despite the lack of empirical work. The tests should be revised when the data are available.

The advantage we see to constructing such tests is again one of functionalism. Briefly, the goals of the collection are to help educators in deciding upon objectives and in determining whether the chosen objectives have been met. A more logically coherent organization of the objectives, as described above, was intended to assist in the selection of objectives; they could more easily be found if nothing else. The sample items are intended not only to add clarity to the

objectives but also to serve as a model for the construction of performance-based indicators. Unfortunately, such test construction rarely has taken place. Thus, the major advantage of having ready-made criterion tests is that such tests will facilitate use of performance-based indicators in the evaluation of instruction. A teacher might be willing to use one of these ready-made tests and act accordingly when the test covers many hours of instruction; she is more reluctant to create and administer a test to measure mastery of each specific objective.*

Three shortcomings of this testing approach came to mind. First, students might be assessed as able to master an objective at one time but, because of forgetting, not have the skill at a later time. Thus, we favor use of these tests also as retention tests. Second, students might be able to demonstrate mastery of a concept in one context but not in another. For example, a student might be able to demonstrate that he can pronounce CVCe words in a test composed only of such words, but when such a reading problem is embedded in a test having many different types of words, he cannot do nearly so well on pronouncing the CVCe words.** This is a difficult problem. In making criterion referenced tests, inclusion of some "flack" or irrelevant test items is evidently desirable as long as it does not seriously interfere with the efficiency of the evaluation. The third problem is one quite familiar to proponents of the behavioral objectives movement. The analysis of objectives into specific tasks can leave untaught and unmeasured important integrating skills. To use an analogy, a basketball player may have all the shots, moves, etc., and still not be able to play the game well. This, too, is a serious problem. We believe, however, that by moving from making tests of specific objectives to the construction of criterion referenced tests for these more content general objectives, we shall facilitate the construction of test items which require integration of the several specific skills. These problems will not disappear if one fails to test. The testing procedure only brings out the problem more clearly.

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*A school which followed this procedure of using criterion referenced tests to determine if students have mastered these somewhat content general objectives could very easily move into a reporting system to students and parents based on such indicators. For such an alternative to the norm referenced, A, B, C, D, F system, see Millman, Jason. Reporting Student Progress: A Case for a Criterion-Referenced Marking System. Phi Delta Kappan, December, 1970, 52, No. 4, 226-230.

**This effect has been found in the case of mathematics achievement (Wells Hively, personal communication).

Finally, although we see the classification scheme described in this report as a decided improvement over that used in the current collections, the question of goodness is, in part, an empirical matter. We recommend accumulating two kinds of data. First, acceptance data are highly relevant. What are the views of users? What has happened to sales by objective bank agencies as a result of change in format? (An uncritical look at sales figures could be misleading since admittedly inferior collections could "sour" educators on buying revised documents, no matter how good they were.) Second, to test the retrieval capability directly, users ought to be able to locate readily objectives dealing with topics of their choice (as well as some additional objectives relevant to the topic but not considered beforehand).

One criterion of goodness is whether or not existing pools of objectives can be made to fit into the new classification scheme. Although our data are preliminary at this time, the classification scheme discussed in this chapter of the report appears to accomodate very well over 96 per cent of the objectives we have sought to classify.

APPENDIX

APPENDIX A

OBJECTIVE RATING SURVEY FORM USED IN THE JANUARY, 1971 FIELD TRIAL

Students, parents, and teachers all have important opinions about what should be learned in the schools. This form is part of a survey to determine these opinions. The results obtained will be made available to many of those individuals responsible for determining class content in the schools.

DIRECTIONS

Attached you will find three pages containing nineteen objectives lettered A through S and a Response Form. Please fill out the information requested at the top of the Response Form, being sure to print or write neatly.

Read the first objective (Objective A). Then rate Objective A, by circling the appropriate number on the response scale next to where it says "Objective A", using the following scale:

5 - It is extremely important that the student know or be able to do this.

4 - It is very important that the student know or be able to do this.

3 - It is somewhat important that the student know or be able to do this.

2 - It is very unimportant that the student know or be able to do this.

1 - It is extremely unimportant that the student know or be able to do this.

For example, if you thought Objective A was extremely important, then you would circle 5 on the Response Form. If you thought Objective A was extremely unimportant, then you would circle 1 on the Response Form. Circle one of the other numbers if your response is somewhere between.

If for some reason you feel you cannot fairly rate the objective as stated (for example, the meaning is not clear or you do not understand it), then circle the 0 on the Response Form.

Now do the same thing for Objectives B through S. Read each objective as if it were the only one you were judging. Don't try to compare them or rank them while forming your opinions.

When you have completed the survey, place all the materials together and give them to your child to be returned to school.

OBJECTIVES

OBJECTIVE A:

Given the description of an important contribution made by an historical figure in a given historical period, the student will identify the appropriate person from a list of alternatives which includes:

1. William Penn
2. Patrick Henry
3. Samuel Adams
4. John Dickinson
5. Thomas Paine
6. Thomas Jefferson
7. James Madison
8. Andrew Jackson
9. Alexander Hamilton
10. John Adams
11. George Washington
12. John C. Calhoun
13. Daniel Webster
14. Henry Clay
15. William Lloyd Garrison
16. Andrew Carnegie
17. Theodore Roosevelt
18. John D. Rockefeller
19. Eugene Debs
20. William Jennings Bryan
21. Ralph Abernathy
22. Stokely Carmichael
24. Martin Luther King
25. Malcolm X

OBJECTIVE B:

Given a factual description of a specific historical incident, the student will demonstrate his ability to recognize reasonable inferences by selecting, from a list of alternatives, that inference which is reasonable based upon the given facts.

OBJECTIVE C:

Given a statistical chart, graph, or map, the student will select from a list of alternatives the statement which best describes the data presented.

OBJECTIVE D:

Given a famous historical speech, the student will analyze given aspects of its form and content.

OBJECTIVE E:

Given an historical document, the student will analyze its form and content by answering the following questions about the document:

1. What was the political climate at the time the document was written?

2. What was the purpose of the document?

3. What is the frame of reference of the author?

4. What is one specific argument used by the author to accomplish his purpose?

OBJECTIVE F:

Given a description of an Act imposed upon the American Colonies by the British Government, the student will select, from a list of alternatives, the name of the Act being described.

OBJECTIVE G:

Given a description of goals for improving society to which Americans subscribed at given times in history, the student will select from a list of alternatives the statement which best describes the cultural values implicit in those goals.

OBJECTIVE H:

Given a description of a particular philosophy or philosophical idea which had important consequences in a period of American History, the student will select, from a set of alternatives, the statement which best exemplifies the implementation of that idea.

OBJECTIVE I:

The student will select from a list of alternatives the statement which describes the most important common element present in given instances of political protest.

OBJECTIVE J:

Given a description of American involvement in a military conflict during an historical period, the student will write a paragraph describing some of its major effects upon American attitudes.

OBJECTIVE K:

Given a description of an important historical event involving influences or interventions of one nation upon another, the student will select, from a list of alternatives, the statement which best describes the commonly accepted reason for the influence or intervention.

OBJECTIVE L:

Given a description of important changes in society and/or culture brought about during a particular historical period, the student will identify, from a set of alternatives, the statement which best describes the commonly accepted probable cause of those changes.

OBJECTIVE M:

Given the description of an historically significant Supreme Court case, the student will identify the name of the case from a list of alternatives which includes:

1. Dred Scot v. Sandford
2. Baker v. Carr
3. McCulloch v. Maryland
4. Marbury v. Madison
5. Dartmouth College v. Woodward
6. Ex Parte Milligan
7. Curtiss-Wright

OBJECTIVE N:

Given the description of a Supreme Court case in which a right protected or guaranteed by the Constitution was violated, the student will identify the Section(s) of the Constitution or the Amendment(s) to the Constitution under which this right is guaranteed.

OBJECTIVE O:

Given a description of an important piece of legislation during a period in American history, the student will answer relevant questions pertaining to the significance or preferred significance of that legislation by selecting from a list of alternatives the most appropriate statement.

OBJECTIVE P:

The student will demonstrate his knowledge of American territorial acquisitions or expansions between 1865 and 1930 by

identifying the territories acquired and/or reasons for territorial expansion.

OBJECTIVE Q:

The student will demonstrate his knowledge of significant geographical locations during World War II by identifying strategic locations.

OBJECTIVE R:

The student will deomonstrate his knowledge of the United Nations by completing given statements concerning its formation and function.

OBJECTIVE S:

Given a tentative hypothesis which purports to explain an historical event, the student will gather data relevant to the hypothesis and prepare a written report analyzing the hypothesis in the light of the data he has collected. The report will be evaluated according to the following criteria:

1. Data must be clearly relevant to the hypothesis. It may be positive, in that it tends to support the hypothesis, or negative, in that it tends to rdfute the hypothesis.

2. The sources from which the data are collected must be generally reliable. All sources must be identified and all quotations and citations footnoted.

3. Length of the report will be specified by the teacher.

4. The report must contain a paragraph of evaluation which states precisely how the data tends to support or refute the hypothesis.

5. If the data supports the hypothesis, it should then be stated in the form of a generalization.

6. If the data tends to refute the hypothesis, it should then be restated in a manner consistent with the data, if this is possible.

7. The student must state any logical implications of the hypothesis which must be rejected on the basis of the data collected.

APPENDIX B

QUALITY CONTROL SURVEY PROCEDURE*

The survey procedure can be explained most easily, perhaps, by examining each document or group of documents which went into forming the complete survey kit. The kit can be broken down as follows:

I. Pre-Letter

II. Student/Parent Section

- A. Cover Letter
- B. Directions
- C. Objectives to be rated
  - 1. With Sample Test Items
  - 2. Without Sample Test Items
- D. Parent Response Form
- E. Student Response Form

III. Teacher Section

- A. Instructions to the Teacher
- B. Cover Letter
- C. Directions
- D. Objectives
  - 1. With Sample Test Items
  - 2. Without Sample Test Items
- E. Response Form
- F. IOX Order Form/Catalog
- G. IOX Description Booklet

IV. Return Envelope

The Pre-Letter (See Example 1)

The teacher was instructed to hand out one copy of the pre-letter to each student in the classroom. The students were to read it and ask any questions concerning the letter. The teacher was to answer the questions to the best of her/his ability. The students were then instructed to take the pre-letter home to the parents and have them read it.

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*This section of the report was prepared by Hal S. Malkin, who supervised this phase of the quality control activities.

The purpose of the pre-letter was to get the students and parents prepared to complete the rating forms which they were to receive later in the week. There were two goals to the pre-letter. First, it was written in such a way as to stir up an enthusiasm towards completing the survey by making the participants feel they were involved in doing something which would have real effects in determining at least part of what goes on in the schools. Second, there was an explanation, albeit brief, of what an objective is plus some examples. This was done so that the students and parents would not be caught by surprise when the rating forms were placed in front of them

The design of the pre-letter was such that it could be used with either of our sets of objectives to be rated, that is, it could be used either with those objectives containing sample test items or those without sample test items (See section on the Objectives to be Rated). This was accomplished by using the sample test item in the pre-letter as an example of how a student would demonstrate that he had reached a terminal behavior. Thus the sample test item was shown as a possible part of a complete objective, but not a necessary part.

The pre-letter was designed to be distributed approximately three days prior to the distribution of the survey kits themselves. This allowed sufficient time for the document to be read, but was not so early as to be forgotten by the time the survey kits were distributed.

Student/Parent Section

From this point on special mention will be made of the color of the paper on which the document under discussion was printed. The use of various colors in the paper enabled the formation of instructions which were much easier to follow and enabled the teacher to be sure that the correct document was being used at the correct time. Since the pre-letter was distributed by itself, there was no need to use a specially colored paper. We chose to print it on blue paper, since the cover letter which accompanied the rating kits (and was almost a duplicate of the pre-letter) was printed on blue paper.

The Cover Letter -- Blue Paper (Example 2)

The cover letter was essentially a copy of the pre-letter. It was intended to remind the reader of having previously received the pre-letter and again gives an example of an objective and a sample test item.

In trial runs with the survey kit, many complaints were received stating that the raters thought that we had eliminated too

much of the subject matter in the objective sets which they were rating. Since they were each only rating a few objectives from the total subject matter field, we inserted a paragraph explaining this to those participating in the survey. This seems to have been effective, since no similar complaints were received in the large scale survey.

The Directions -- Blue Paper (Example 3)

The directions section was explicit as to how the rating forms were to be completed. First, it told what materials the student or parent should have in front of him. The documents were refered to by name and color. Second, the scale by which the objectives were to be rated was clearly defined. A one through five scale was chosen, with five being the best positive response and one the worst negative response. We also included a zero to prevent rating of the objective when it was not clearly understood. How this zero was used in analyzing the data can be found in the data analysis which follows the procedural section of this chapter. Third, we explained that the answer sheet may contain more spaces for ratings than there were objectives to rate. There was a dual purpose in having more spaces for ratings than there were objectives to rate. First, it permitted the use of a standardized answer sheet which was easier and less costly to duplicate. For this purpose the answer sheet had a number of answer positions which was at least one greater than the largest number of objectives which any student or parent would have to rate. Second, it enabled us to reject those rating forms which had every response position on the rating form marked. This indicated to us that the rater did not look at the objectives when making his responses, but instead, just went down the answer form randomly making responses, if not for each of the objectives, at least for some of them. (See more about this in the section describing the objective sets which follows this section)

Finally, the directions section included instructions to the students and parents describing what to do upon completion of the response form.

The Objectives To Be Rated -- White Sheets (Examples 4 and 5)

The objectives used in the large scale survey represented all the objectives in the Study Skills Sections of the IOX Reading Collections covering the K-3, 4-6, and 7-12 grade levels.

The K-3 Reading Collection yielded 30 objectives, the 4-6 Reading Collection yielded 52 objectives and the 7-12 Collection yielded 25 collections. Prototype experiments suggested that the maximum number of objectives we could expect stu-

dents to rate effectively was in the neighborhood of ten objectives. Above this number a fatigue or boredom factor set in and we began to get spurious results. This was verified by both the number of invalid answer forms and through the use of follow-up interviews after the experiments. The prototype experiments also suggested that we could expect teachers to rate about thirty objectives before we caused a loss of interest in the survey. With this information in hand, the objective sets were divided as follows:

> The 30 grade level K-3 objectives were randomly divided into three sets of ten objectives each, labeled sets A, B, and C.
>
> The 52 grade level 4-6 objectives were first randomly divided into two sets of 26 objectives each (to limit the size of the teacher responses) and then each of these two sets were subdivided into three subsets, each containing 8, 9, and 9 objectives each, labeled sets D, E, F, G, H, and J.
>
> The 25 grade level 7-12 objectives were randomly divided into three sets of 8, 8, and 9 objectives each, labeled M, N, and P.

The objectives sets were then formed. At the top of the page was placed a title specifying the general subject area from which the objectives came, the specific area within the subject matter, the grade level to which the objectives were aimed, and finally, the specific grades where the objectives were to be used. This was done so that the objectives could be rated with consideration of the relevant subject matter area and grade level.

Following the title came a series of objectives labeled A1, G6, P8, etc., depending on which subset they represented. Then, after the final objective in the set, the phrase "This completes your list of objectives" was printed. This was done so that those who properly completed the survey would not become confused by having more response positions on the response form than there were objectives. They might have thought that some of the objectives were missing and for that reason not have returned the response form.

The large-scale survey used two types of objective sets. The first contained only the objectives for the readers to rate (See example 4). The second contained objectives with sample test items (See example 5). This was done to see if the inclusion of sample test items influenced the ratings. A discussion of the results of this part of the experiment appears in the data analysis section.

The Parent Response Form -- Yellow Paper (Example 6)

The parent response form asked for the school name, child's grade level, and sex, information which was to be used in the data analysis. Included on the form was a reproduction of the response scale to be used. It was placed on the response form for easy access. Then came the response positions. There were 11 response positions, one greater than the largest set of objectives. This was done for the reasons stated above.

The Student Response Form -- Pink Paper (Example 7)

A student response form was included in all survey kits for the fourth grade level and above. It was decided to eliminate the student responses for the K-3 levels, since experience showed us that understanding of the objectives at this level was very minimal and appeared to yield unreliable results. With the exception of the color of the paper, the student response form was identical to the parent response form.

When all these elements were placed together, a Student/Parent survey kit was formed. Example 8A - 8E shows what a complete kit would look like. The color coding enabled simple checking of the kits and helped to assure that the proper sheets were being used. All a teacher had to do was look at the color of the paper which the student was looking at or writing on to be sure that things were going well.

Teacher Survey Kit

Instructions to the Teacher -- White Paper (Example 9 and 10)

The first page of the teacher survey kit consisted of a set of instructions to the teacher. It began with a paragraph explaining the survey, by whom it was being administered, and how the data would be used. The second paragraph thanked the teacher for his/her cooperation and explained that they would receive a free IOX collection of their choice. Then came a series of instructions which the trial runs of the survey system showed would "enable the teacher to complete the survey using a minimum of class time."

Since the K-3 objective sets did not include student response forms, all references to the student response forms were excluded from the teacher's instruction sheet (for these grade levels, see example 9). The K-3 instruction sheet explained what each set should have and to have the students take the kits home to their parents. Two class days were to be al-

lowed for return of the parent response forms. Finally, the teacher was told what to place in the return envelope.

The 4-12 sets did include student responses, and, for this reason, the instructions to the teacher were longer. (See examples 10A and 10B). Again, a listing of the contents of each set, by name and color code, was included. Since the students in any one class could have one of three sets of objectives, it was felt important to include the warning that not all sets would look the same as to the type of objectives or number.

The next series of instructions dealt with having the students complete their part of the survey. Again, much use was made of the color coding. The statement, "PLEASE DO NOT ATTEMPT TO INTERPRET ANY OF THE OBJECTIVES FOR THE STUDENTS," was included to prevent the teachers from adding further variation into the ratings by adding the variability of different interpretations.

The teacher was then instructed to complete his/her part of the survey and what to do when the students finished. From this point on, the instructions were the same as for the K-3 objective sets.

The Cover Letter -- Blue Paper (Example 11)

The Directions -- Blue Paper (Example 12)

These are the same as have already been described in the section covering the Student/Parent survey kit.

The Objectives to be Rated -- White Paper (Examples 13, 14, and 15)

These were exactly the same as the objective sets which the Student/Parent kits contained. The difference with the teachers' objectives was in the number to be rated. Whereas any one student would have only approximately 10 objectives, each teacher had approximately 30 objectives. This was accomplished by dividing each class into thirds and assigning each student one of three objective sets. The teacher would then be asked to rate each of the objective sets that his/her students were rating. For example, let us assume a seventh grade class of 30 students. Ten of the students would receive a survey set containing objectives M1 through M8, ten students would receive sets containing objectives N1 through N8, and ten would receive sets containing objectives P1 through P8. The teacher would receive all three objective sets and would be asked to rate all three objective sets. This was done to enable us to coordinate the teacher, stu-

dent, and parent data on the same objective sets from the same classrooms. If the students and/or parents received objective sets with sample test items, the teacher received the same. (To see how sampling of all objective sets was assured, refer to the section on assembling the survey kits.)

Teacher Response Form -- Green Sheets (Example 16A and 16B)

The teacher response form asked for the school name, grade level, course title, and number of students. Also included was a rough breakdown as to the general ability of students (above average, average, or below average), again to be used in the analysis of the data. Immediately following was a reproduction of the rating scale. Then came the space for the responses. In the case of the teacher, there were three sets of response areas, one to cover each set of objectives. Thus, the teacher in the example above would have had responses for M1 - M8, N1 - N8, and P1 - P9, a total of 25 responses.

IOX Order Form/Catalog -- Yellow Card

An order form was provided to enable the teacher to order the complimentary collection. It also served to introduce the teacher to the other IOX collections.

IOX Description Booklet

A booklet describing the Instructional Objectives Exchange, its rationale and services, was provided to acquaint the teacher with IOX.

When all these elements were placed together, a teacher survey kit was formed. The materials were used in the fashion described above.

Example 1
(Blue Paper)

THE INSTRUCTIONAL OBJECTIVES EXCHANGE
Box 24095 Los Angeles, California 90024

A Non-profit Educational Corporation

Students, parents and teachers all have important ideas about what should be taught in the schools. The Instructional Objectives Exchange, a non-profit corporation for the development of educational materials, is interested in obtaining your opinion about certain goals of education.

Later this week, you will be asked to make judgements about a brief list of instructional objectives. An objective is a goal for the teacher and the student; that is, it states a particular area of knowledge or a skill that the student is expected to learn and tells what he will be asked to do to demonstrate that he has learned it.

For example, an objective in a physical education class might be:

> The student will run the 100-yard dash in less than fifteen seconds.

Many objectives begin with a statement of the information or materials with which the student will be provided when he demonstrates his learning. For example, a typical objective for an English class might be:

> Given a list of incomplete sentences and a choice between an adjective and an adverb to complete each sentence, the student will select the correct alternatives.

He would demonstrate that he had reached this goal by successfully completing an exercise such as the following:

> SAMPLE ITEM:
>
> Select the correct word to complete each sentence by circling your choice:
> 1. This motor runs _____. (quiet, quietly)
> 2. He feels _____about missing the game. (bad, badly)
> 3. Fold your letter _____. (neat, neatly)

With the list of objectives that you will be receiving in a few days, you will receive a rating form on which to indicate your opinion of each objective. We would like to know which skills you feel are important for a student to learn.

Throughout the country, many teachers and other individuals responsible for determining class content use IOX collections of objectives in their planning. The results of this research will be made available to them and will also be used in revising the collections. We believe that this is vital information and we sincerely request your support. Thank you for your cooperation.

Example 2
(Blue Paper)

THE INSTRUCTIONAL OBJECTIVES EXCHANGE
Box 24095 Los Angeles, California 90024

A Non-profit Educational Corporation

Earlier this week you received a letter describing some research being conducted by IOX and your school system. On the following pages you will find statements of instructional objectives or goals. Each objective represents some skill which a student might be expected to learn, and a way in which he would demonstrate that he has reached this goal. For example, an objective in an English class might be:

> Given a list of incomplete sentences and a choice between an adjective and an adverb to complete the sentence, the student will select the correct alternatives.

The student would demonstrate that he has reached this goal by successfully completing an exercise such as the following:

Sample item:

Select the correct word to complete each sentence by circling your choice.

1. This motor runs _____. (quiet, quietly)
2. He feels _____ about missing the game. (bad, badly)
3. Fold your letter _____. (neat, neatly)

For each of the attached set of objectives, we would like to know whether you think it should be included in the instruction a student receives. It must be emphasized that each of the objectives which you will be rating is only part of a much larger set of objectives from the area of study under consideration. Thus, if you are rating objectives in reading, each objective you rate represents only a small step in the learning of reading skills. If you are rating objectives in some other field, then each objective represents only a part of the total subject matter in that field.

The opinions of students, parents, and teachers obtained from this study will be made available to teachers and other individuals responsible for determining class content in the schools. Thank you for your cooperation.

(PLEASE TURN THE PAGE FOR DIRECTIONS)

Example 3
(Blue Paper)

Directions

Attached you will find white pages containing numbered objectives, and rating forms (pink for students, yellow for parents). Please fill in the information requested at the top of the appropriate rating form, being sure to print or write neatly.

Read the first objective carefully. Then indicate your opinion of the importance of that objective by circling one number next to "Objective 1" on the rating form, using the following scale:

1 - this objective definitely should be included in the instruction I (my child) receive (s)

2 - this objective probably should be included in the instruction I (my child) receive(s)

3 - it makes no difference to me whether or not this objective is included in the instruction I (my child) receive(s)

4 - this objective probably should not be included in the instruction I (my child) receive(s)

5 - this objective definitely should not be included in the instruction I (my child) receive(s)

For example, if you think Objective 1 definitely should be included in instruction, you would circle the number five (5).

Example: OBJECTIVE A1: (5) 4 3 2 1 0

If you think Objective 1 definitely should not be included, you would circle the number one (1). Circle one of the other numbers if your rating is somewhere between these two extremes. Rate each of the other objectives in the same manner.

If you feel you cannot rate a particular objective fairly or do not understand what is meant by it, circle zero (0) on the rating form.

You may not have as many objectives as there are spaces for ratings on the rating form. Rate all the objectives you have and leave the rest of answer sheet blank.

Please rate each objective as if it were the only one you were judging. Do not attempt to compare them with each other.

You do not need to write your name on the rating form. Because your responses are anonymous; you can feel free to express your honest opinion about each objective.

Students: When you have completed the survey, pass the Student Rating form to your teacher and take the rest of the materials home to one of your parents.

Parents: When you have completed the survey, give the Parent Rating form to your son or daughter to be returned to school. You may keep the objective list if you wish.

Example 4
(White Paper)

READING OBJECTIVES
STUDY SKILLS -- SECONDARY LEVEL

(Seventh Grade through Twelfth Grade)

OBJECTIVE M1: Given the table of contents in a textbook, the student will locate the chapter in which a specific topic can be found.

OBJECTIVE M2: Given a reading passage, the student will divide it into sections appropriate to its content and give each section a subtitle.

OBJECTIVE M3: The student will deomonstrate speed and accuracy in his use of guide words at the top of each page in the dictionary by locating a list of words within a given time limit and reporting the page number of each, along with its guide words.

OBJECTIVE M4: Given any diagram and a set of related multiple choice questions, the student will read the diagram and answer the questions based upon it.

OBJECTIVE M5: The student will alphabetize lists of words, each of which begins with two or more of the same letters.

OBJECTIVE M6: Given the name of a resource material, the student will identify the specific purposes for which it can be used.

OBJECTIVE M7: Given a story to skim, the student will identify its main divisions.

OBJECTIVE M8: Given an index and a specific topic, the student will identify under which heading in the index the topic would most logically be located.

This completes your list of objectives.

Example 5
(White Paper)

READING OBJECTIVES
STUDY SKILLS -- SECONDARY LEVEL

(Seventh Grade through Twelfth Grade)

OBJECTIVE P1: Given a list of book titles, the student will identify the subject matter and classification number according to the Dewey decimal system of each one.

SAMPLE ITEM: Identify the Dewey decimal system classification number and subject area for each of the following.

1. Stories of King Arthur and His Knights by Barbara L. Picard.

2. Dr. George Washington Carver by Shirley Graham and George D. Lyscomb.

3. Improving Reading Instruction by Donald D. Durrell

ANSWER:

1. 800 - Literature

2. 920 - Biography

3. 300 - Sociology - Education

OBJECTIVE P2: The student will alphabetize a list of words, each of which begins with a different letter.

SAMPLE ITEM: Alphabetize this list of words.

outrageous
penurious
avaricious
bombastic
melancholy

ANSWER:

avaricious
bombastic
melancholy
outrageous
penurious

Example 6
(Yellow Paper)

PARENT RATINGS

School_____ Student's Grade or Level ____

Student's Sex: M___ F___

Use the following scale to indicate your opinion of each instructional objective:

5 - this objective <u>definitely</u> should be included in the instruction my son or daughter receives

4 - this objective <u>probably</u> should be included in the instruction my son or daughter receives

3 - it makes <u>no difference to me</u> whether or not this objective is included in the instruction my son or daughter receives

2 - this objective <u>probably</u> should <u>not</u> be included in the instruction my son or daughter receives

1 - this objective <u>definitely</u> should <u>not</u> be included in the instruction my son or daughter receives

If you do not understand what is meant by a particular objective and feel you cannot rate it fairly, circle zero (0).

Circle only <u>one</u> number for each objective.

Objective M1	5	4	3	2	1	0
Objective M2	5	4	3	2	1	0
Objective M3	5	4	3	2	1	0
Objective M4	5	4	3	2	1	0
Objective M5	5	4	3	2	1	0
Objective M6	5	4	3	2	1	0
Objective M7	5	4	3	2	1	0
Objective M8	5	4	3	2	1	0
Objective M9	5	4	3	2	1	0
Objective M10	5	4	3	2	1	0
Objective M11	5	4	3	2	1	0

Example 7
(Pink Paper)

STUDENT RATINGS

School_____ Grade or Level_____

Sex: M___ F___

Use the following scale to indicate your opinion of each instructional objective:

5 - this objective definitely should be included in the instruction I receive

4 - this objective probably should be included in the instruction I receive

3 - it makes no difference to me whether or not this objective is included in the instruction I receive

2 - this objective probably should not be included in the instruction I receive

1 - this objective definitely should not be included in the instruction I receive

If you do not understand what is meant by a particular objective and feel you cannot rate it fairly, circle zero (0).

Circle only one number for each objective.

Objective M1	5	4	3	2	1	0
Objective M2	5	4	3	2	1	0
Objective M3	5	4	3	2	1	0
Objective M4	5	4	3	2	1	0
Objective M5	5	4	3	2	1	0
Objective M6	5	4	3	2	1	0
Objective M7	5	4	3	2	1	0
Objective M8	5	4	3	2	1	0
Objective M9	5	4	3	2	1	0
Objective M10	5	4	3	2	1	0
Objective M11	5	4	3	2	1	0

Example 8A
(Blue Paper)

THE INSTRUCTIONAL OBJECTIVES EXCHANGE
Box 24095 Los Angeles, California 90024

A Non-profit Educational Corporation

Earlier this week you received a letter describing some research being conducted by IOX and your school system. On the following pages you will find statements of instructional objectives or goals. Each objective represents some skill which a student might be expected to learn, and a way in which he would demonstrate that he has reached this goal. For example, an objective in an English class might be:

> Given a list of incomplete sentences and a choice between an adjective and an adverb to complete the sentence, the student will select the correct alternatives.

The student would demonstrate that he has reached this goal by successfully completing an exercise such as the following:

> Sample item:
>
> Select the correct word to complete each sentence by circling your choice.
> 1. This motor runs _____. (quiet, quietly)
> 2. He feels _____ about missing the game. (bad, badly)
> 3. Fold your letter _____. (neat, neatly)

For each of the attached set of objectives, we would like to know whether you think it should be included in the instruction a student receives. It must be emphasized that each of the objectives which you will be rating is only part of a much larger set of objectives from the area of study under consideration. Thus, if you are rating objectives in reading, each objective you rate represents only a small step in the learning of reading skills. If you are rating objectives in some other field, then each objective represents only a part of the total subject matter in that field.

The opinions of students, parents, and teachers obtained from this study will be made available to teachers and other individuals responsible for determining class content in the schools. Thank you for your cooperation.

(PLEASE TURN THE PAGE FOR DIRECTIONS)

Example 8B
(Blue Paper)

Directions

Attached you will find white pages containing numbered objectives, and rating forms (pink for students, yellow for parents). Please fill in the information requested at the top of the appropriate rating form, being sure to print or write neatly.

Read the first objective carefully. Then indicate your opinion of the importance of that objective by circling one number next to "Objective 1" on the rating form, using the following scale:

1 - this objective definitely should be included in the instruction I (my child) receive (s)

2 - this objective probably should be included in the instruction I (my child) receive(s)

3 - it makes no difference to me whether or not this objective is included in the instruction I (my child) receive(s)

4 - this objective probably should not be included in the instruction I (my child) receive(s)

5 - this objective definitely should not be included in the instruction I (my child) receive(s)

For example, if you think Objective 1 definitely should be included in instruction, you would circle the number five (5).

Example: OBJECTIVE A1: (5) 4 3 2 1 0

If you think Objective 1 definitely should not be included, you would circle the number one (1). Circle one of the other numbers if your rating is somewhere between these two extremes. Rate each of the other objectives in the same manner.

If you feel you cannot rate a particular objective fairly or do not understand what is meant by it, circle zero (0) on the rating form.

You may not have as many objectives as there are spaces for ratings on the rating form. Rate all the objectives you have and leave the rest of answer sheet blank.

Please rate each objective as if it were the only one you were judging. Do not attempt to compare them with each other.

You do not need to write your name on the rating form. Because your responses are anonymous; you can feel free to express your honest opinion about each objective.

Students: When you have completed the survey, pass the Student Rating form to your teacher and take the rest of the materials home to one of your parents.

Parents: When you have completed the survey, give the Parent Rating form to your son or daughter to be returned to school. You may keep the objective list if you wish.

Example 8C
(White Paper)

READING OBJECTIVES
STUDY SKILLS -- SECONDARY LEVEL

(Seventh Grade through Twelfth Grade)

OBJECTIVE N1: Given a series of related paragraphs, the student will summarize their content by making an outline.

OBJECTIVE N2: Given a factual report, the student will make a simple outline of its content.

OBJECTIVE N3: The student will alphabetize a list of words, each of which begins with the same letter.

OBJECTIVE N4: Given a set of statistics, the student will construct a chart, map, or graph, as directed.

OBJECTIVE N5: The student will demonstrate his understanding of diacritical markings in the dictionary by explaining those found for a given set of words.

OBJECTIVE N6: Given a selection containing 400 to 500 words, and a list of short questions on its content, the student will read the selection within a specified time limit and answer the questions.

OBJECTIVE N7: Given a list of questions on the contents of a specific textbook, the student will demonstrate his ability to use the parts of a text by answering each question.

OBJECTIVE N8: Given a series of supporting ideas, the student will supply a heading appropriate to their content.

This completes your list of objectives.

Example 8D
(Yellow Paper)

PARENT RATINGS

School_____ Student's Grade or Level____

Student's Sex: M___ F___

Use the following scale to indicate your opinion of each instructional objective:

5 - this objective <u>definitely</u> should be included in the instruction my son or daughter receives

4 - this objective <u>probably</u> should be included in the instruction my son or daughter receives

3 - it makes <u>no difference to me</u> whether or not this objective is included in the instruction my son or daughter receives

2 - this objective <u>probably</u> should <u>not</u> be included in the instruction my son or daughter receives

1 - this objective <u>definitely</u> should <u>not</u> be included in the instruction my son or daughter receives

If you do not understand what is meant by a particular objective and feel you cannot rate it fairly, circle zero (0).

Circle only <u>one</u> number for each objective.

Objective N1	5	4	3	2	1	0
Objective N2	5	4	3	2	1	0
Objective N3	5	4	3	2	1	0
Objective N4	5	4	3	2	1	0
Objective N5	5	4	3	2	1	0
Objective N6	5	4	3	2	1	0
Objective N7	5	4	3	2	1	0
Objective N8	5	4	3	2	1	0
Objective N9	5	4	3	2	1	0
Objective N10	5	4	3	2	1	0
Objective N11	5	4	3	2	1	0

Example 8E
(Pink Paper)

STUDENT RATINGS

School_____ Grade or Level_____

Sex: M___ F___

Use the following scale to indicate your opinion of each instructional objective:

5 - this objective definitely should be included in the instruction I receive

4 - this objective probably should be included in the instruction I receive

3 - it makes no difference to me whether or not this objective is included in the instruction I receive

2 - this objective probably should not be included in the instruction I receive

1 - this objective definitely should not be included in the instruction I receive

If you do not understand what is meant by a particular objective and feel you cannot rate it fairly, circle zero (0).

Circle only one number for each objective.

Objective N1	5	4	3	2	1	0
Objective N2	5	4	3	2	1	0
Objective N3	5	4	3	2	1	0
Objective N4	5	4	3	2	1	0
Objective N5	5	4	3	2	1	0
Objective N6	5	4	3	2	1	0
Objective N7	5	4	3	2	1	0
Objective N8	5	4	3	2	1	0
Objective N9	5	4	3	2	1	0
Objective N10	5	4	3	2	1	0
Objective N11	5	4	3	2	1	0

Example 9
(White Paper)

TO THE TEACHER:

The package which you received is part of a survey being conducted by the Instructional Objectives Exchange (see attached booklet) and your school system. It is assumed that you have been previously informed of the possibility of being involved in this survey, the purpose of which is to obtain teacher, student, and parent ratings of the importance of certain instructional objectives. The data collected will be made a part of the objective collections published by IOX and will aid in the revision of these collections.

We at IOX greatly appreciate your cooperation in this survey and thank you for devoting a small amount of your time and classroom time to completing the survey. To express our appreciation, we are offering you your choice of any one of the objective collections published by IOX (see the attached catalog/order card).

The following directions have been designed to enable you to complete the survey using a minimum of class time.

DIRECTIONS

A. Pass out one survey set to each student. Be sure to pass out the sets in numerical order starting with set No. 1. Disregard any leftover sets. Each set should contain:

    * A cover letter with directions (blue sheets)
    * A set of instructional objectives (white sheet(s))
    * A Parent Ratings form (yellow sheet)

B. Tell the students to take the set home with them and have their parents complete the Parent Ratings form (yellow sheet) according to the directions contained in the cover letter.

C. Allow two class days for the Parent Ratings forms to be returned to school.

D. After the two days have elapsed, place the Teacher Ratings form (green sheet), the Parent Ratings forms (yellow sheets), and the yellow order card marked with your selection and mailing information all together in the large, stamped, addressed manila envelope, and drop it in the nearest mailbox.

IOX will mail your free collection immediately upon receipt of your completed package.

Thank you for your cooperation

Example 10A
(White Paper)

TO THE TEACHER:

The package which you have received is part of a survey being conducted by the Instructional Objectives Exchange (see attached booklet) and your school system. It is assumed that you have been previously informed of the possibility of being involved in this survey, the purpose of which is to obtain teacher, student, and parent ratings of the importance of certain instructional objectives. The data collected will be made a part of the objective collections published by IOX and will aid in the revision of these collections.

We at IOX greatly appreciate your cooperation in this survey and thank you for devoting a small amount of your time and classroom time to completing the survey. To express our appreciation, we are offering you your choice of any one of the objective collections published by IOX (see the attached catalog/order card).

The following directions have been designed to enable you to complete the survey using a minimum of class time.

DIRECTIONS

A. Pass out one survey set to each student. Be sure to pass out the sets in numerical order, starting with set No. 1. Disregard any leftover sets. Each set should contain:

    * A cover letter with directions (blue sheets)
    * A set of instructional objectives (white sheet(s))
    * A Parent Ratings form (yellow sheet)
    * A Student Ratings form (pink sheet)

    Please emphasize to the students that they do not necessarily have the same sets of objectives. Some may have more objectives, some may have sets that look different than others.

B. Have the students remove the last sheet (pink) from the set. This is labelled Student Ratings.

C. Have the students fill in the information requested at the top of the sheet. Check that all students are using PINK sheets.

D. Have the students read the cover letter, particularly the "directions section" (blue sheets). Answer any questions which may arise to the best of your ability. A copy of these blue sheets will be found attached to this letter.

(continued)

E. After you are sure the students understand the directions, have them complete the survey, making sure they mark their responses on the Student Ratings form (pink sheet).

Should any questions arise dealing with procedures, etc., feel free to answer them. But, PLEASE DO NOT ATTEMPT TO INTERPRET ANY OF THE OBJECTIVES FOR THE STUDENTS. If they feel they do not understand a particular objective, then have them circle zero (0) on the ratings form.

F. While the students are completing their part of the survey, if possible, complete the Teacher Ratings form (green sheet) attached to this direction sheet. If interpretations prevent your completing the form at this time, please complete it as soon as possible.

You will be rating the same objectives as your students, but you are rating all of the objectives while each student is rating only a part of your set.

G. When the students have finished their part of the survey, have them hand in their ratings forms. Please collect them and keep them together.

H. Tell the students to take the rest of the set home with them and have their parents complete the Parent Ratings form (yellow sheet) according to the directions contained in the cover letter.

I. Allow two class days for the Parent Ratings forms to be returned to school.

J. After the two days have elapsed, place the Teacher Ratings form (green sheet), the Student Ratings forms (pink sheets), the Parent Ratings forms (yellow sheets), and the yellow order card marked with your selection and mailing information all together in the large, stamped, addressed manila envelope, and drop it in the nearest mailbox.

IOX will mail your free collection immediately upon receipt of your completed package.

Thank you for your cooperation

Example 11
(Blue Paper)

THE INSTRUCTIONAL OBJECTIVES EXCHANGE
Box 24095 Los Angeles, California 90024

A Non-profit Educational Corporation

Earlier this week you received a letter describing some research being conducted by IOX and your school system. On the following pages you will find statements of instructional objectives or goals. Each objective represents some skill which a student might be expected to learn, and a way in which he would demonstrate that he has reached this goal. For example, an objective in an English class might be:

> Given a list of incomplete sentences and a choice between an adjective and an adverb to complete the sentence, the student will select the correct alternatives.

The student would demonstrate that he has reached this goal by successfully completing an exercise such as the following:

Sample item:

Select the correct word to complete each sentence by circling your choice.

1. This motor runs _____. (quiet, quietly)
2. He feels _____ about missing the game. (bad, badly)
3. Fold your letter _____. (neat, neatly)

For each of the attached set of objectives, we would like to know whether you think it should be included in the instruction a student receives. It must be emphasized that each of the objectives which you will be rating is only part of a much larger set of objectives from the area of study under consideration. Thus, if you are rating objectives in reading, each objective you rate represents only a small step in the learning of reading skills. If you are rating objectives in some other field, then each objective represents only a part of the total subject matter in that field.

The opinions of students, parents, and teachers obtained from this study will be made available to teachers and other individuals responsible for determining class content in the schools. Thank you for your cooperation.

(PLEASE TURN THE PAGE FOR DIRECTIONS)

Example 12
(Blue Paper)

Directions

Attached you will find white pages containing numbered objectives, and rating forms (pink for students, yellow for parents). Please fill in the information requested at the top of the appropriate rating form, being sure to print or write neatly.

Read the first objective carefully. Then indicate your opinion of the importance of that objective by circling one number next to "Objective 1" on the rating form, using the following scale:

1 - this objective definitely should be included in the instruction I (my child) receive (s)

2 - this objective probably should be included in the instruction I (my child) receive(s)

3 - it makes no difference to me whether or not this objective is included in the instruction I (my child) receive(s)

4 - this objective probably should not be included in the instruction I (my child) receive(s)

5 - this objective definitely should not be included in the instruction I (my child) receive(s)

For example, if you think Objective 1 definitely should be included in instruction, you would circle the number five (5).

Example: OBJECTIVE A1: (5) 4 3 2 1 0

If you think Objective 1 definitely should not be included, you would circle the number one (1). Circle one of the other numbers if your rating is somewhere between these two extremes. Rate each of the other objectives in the same manner.

If you feel you cannot rate a particular objective fairly or do not understand what is meant by it, circle zero (0) on the rating form.

You may not have as many objectives as there are spaces for ratings on the rating form. Rate all the objectives you have and leave the rest of answer sheet blank.

Please rate each objective as if it were the only one you were judging. Do not attempt to compare them with each other.

You do not need to write your name on the rating form. Because your responses are anonymous; you can feel free to express your honest opinion about each objective.

Students: When you have completed the survey, pass the Student Rating form to your teacher and take the rest of the materials home to one of your parents.

Parents: When you have completed the survey, give the Parent Rating form to your son or daughter to be returned to school. You may keep the objective list if you wish.

Example 13

READING OBJECTIVES
STUDY SKILLS -- SECONDARY LEVEL

(Seventh Grade through Twelfth Grade)

OBJECTIVE M1: Given the table of contents in a textbook the student will locate the chapter in which a specific topic can be found.

OBJECTIVE M2: Given a reading passage, the student will divide it into sections appropriate to its content and give each section a subtitle.

OBJECTIVE M3: The student will demonstrate speed and accuracy in his use of guide words at the top of each page in the dictionary by locating a list of words within a given time limit and reporting the page number of each, along with its guide words.

OBJECTIVE M4: Given any diagram and a set of related multiple choice questions, the student will read the diagram and answer the questions based upon it.

OBJECTIVE M5: The student will alphabetize lists of words, each of which begins with two or more of the same letters.

OBJECTIVE M6: Given the name of a resource material, the student will identify the specific purposes for which it can be used.

OBJECTIVE M7: Given a story to skim, the student will identify its main divisions.

OBJECTIVE M8: Given an index and a specific topic, the student will identify under which heading in the index the topic would most logically be located.

This completes your list of objectives.

Example 14

READING OBJECTIVES

STUDY SKILLS -- SECONDARY LEVEL

(Seventh Grade through Twelfth Grade)

OBJECTIVE N1: Given a series of related paragraphs, the student will summarize their content by making an outline.

OBJECTIVE N2: Given a factual report the student will make a simple outline of its content.

OBJECTIVE N3: The student will alphabetize a list of words each of which begins with the same letter.

OBJECTIVE N4: Given a set of statistics, the student will construct a chart, map or graph, as directed.

OBJECTIVE N5: The student will demonstrate his understanding of diacritical markings in the dictionary by explaining those found for a given set of words.

OBJECTIVE N6: Given a selection containing 400 to 500 words, and a list of short questions on its content, the student will read the selection within a specified time limit and answer the questions.

OBJECTIVE N7: Given a list of questions on the contents of a specific textbook, the student will demonstrate his ability to use the parts of a text by answering each question.

OBJECTIVE N8: Given a series of supporting ideas, the student will supply a heading appropriate to their content.

This completes your list of objectives.

Example 15

READING OBJECTIVES

STUDY SKILLS -- SECONDARY LEVEL

(Seventh Grade through Twelfth Grade)

OBJECTIVE P1: Given a list of book titles, the student will identify the subject matter and classification number according to the Dewey decimal system of each one.

OBJECTIVE P2: The student will alphabetize a list of words, each of which begins with a different letter.

OBJECTIVE P3: Given a report, the student will summarize its content.

OBJECTIVE P4: Given a topographical map with an elevation scale, and a list of geographic locations, the student will identify the approximate altitude above sea level for each location.

OBJECTIVE P5: Given a list of library references and a set of short, descriptive topics, the student will identify the reference source for each topic.

OBJECTIVE P6: Given a series of related paragraphs, the student will summarize their main ideas or topic sentences by writing a set of short notes.

OBJECTIVE P7: Given a list of library resource materials and a set of specific items of information, the student will identify the appropriate source for each item of information.

OBJECTIVE P8: Given a set of sentences, each missing a word, and two phonetic spellings for the missing word, the student will identify the correct phonetic spelling of the word omitted in each sentence.

OBJECTIVE P9: Given a factual article, the student will outline its content and provide a title derived from the main idea.

This completes your list of objectives.

Example 16A
(Green Paper)

TEACHER RATINGS

School_____ Grade or Level:_____

Course title_____ Number of students_____

General ability of students (check one):
above average average below average

Use the following scale to indicate your opinion of each instructional objective:

5 - this objective definitely should be included as part of the instruction in the subject under consideration

4 - this objective probably should be included as part of the instruction in the subject under consideration

3 - it makes no difference to me whether or not this objective is included as part of instruction in the subject under consideration

2 - this objective probably should not be included as part of the instruction in the subject under consideration

1 - this objective definitely should not be included as part of the instruction in the subject under consideration

If you feel you cannot rate a particular objective fairly or you do not understand what is meant by it, circle zero (0).

Circle only one number for each objective.

Objective D1	5	4	3	2	1	0
Objective D2	5	4	3	2	1	0
Objective D3	5	4	3	2	1	0
Objective D4	5	4	3	2	1	0
Objective D5	5	4	3	2	1	0
Objective D6	5	4	3	2	1	0
Objective D7	5	4	3	2	1	0
Objective D8	5	4	3	2	1	0
Objective D9	5	4	3	2	1	0
Objective D10	5	4	3	2	1	0
Objective D11	5	4	3	2	1	0

Example 16 B
(Green Paper)

Objective E1	5	4	3	2	1	0
Objective E2	5	4	3	2	1	0
Objective E3	5	4	3	2	1	0
Objective E4	5	4	3	2	1	0
Objective E5	5	4	3	2	1	0
Objective E6	5	4	3	2	1	0
Objective E7	5	4	3	2	1	0
Objective E8	5	4	3	2	1	0
Objective E9	5	4	3	2	1	0
Objective E10	5	4	3	2	1	0
Objective E11	5	4	3	2	1	0

Objective F1	5	4	3	2	1	0
Objective F2	5	4	3	2	1	0
Objective F3	5	4	3	2	1	0
Objective F4	5	4	3	2	1	0
Objective F5	5	4	3	2	1	0
Objective F6	5	4	3	2	1	0
Objective F7	5	4	3	2	1	0
Objective F8	5	4	3	2	1	0
Objective F9	5	4	3	2	1	0
Objective F10	5	4	3	2	1	0
Objective F11	5	4	3	2	1	0

Conducting the Survey

Having examined the documents which go into forming the survey kits, the procedures required for obtaining the data proper can be described.

Initial Contact with the District

Initial contact with the School District should be aimed at obtaining the following information:

1. Who will be the prime contact within the school district? That is, who will the persons administering the survey be working with relative to the obtaining of information and approval of the various documents which will be distributed?

2. What form of internal method of distribution of mail does the district possess and what are the necessary lead times to assure that materials arrive at the schools on time?

3. Have the district office provide a school-by-school breakdown of classes providing:

   a. Teacher's name
   b. Grade level(s) or classes taught
   c. Number of students per class

4. Any other information which might be of value in analyzing the data (e.g., income levels by school, ethnic breakdowns of the schools, etc.)

Having a single person with the responsibility of making procedural decisions will enable the survey to be conducted most efficiently by permitting a central area for all questions and problems to be sent. In the large-scale survey, we used the Office of Pupil Personnel as a central clearing house.

Ascertaining the method of internal distribution of mail will enable those conducting the survey to meet the requirements for proper addressing and packaging of the survey kits and assure that the materials will reach the schools on time and in the proper sequence. If the school district does not possess an internal method of distribution, then the survey kits will have to be mailed directly to the schools. If this should be necessary, then the mailing addresses of the schools which will be involved in the survey will have to be obtained. Direct mailing, of course, increases the chance of the schools not receiving the survey kits on time, so the lead time for mailing will have to be lengthened to cover for this factor.

Designing the Survey

Using a school-by-school breakdown of classes, select the schools where the rating survey is to take place. This can be done either in a random manner or by use of specific criteria (e.g., by general income levels, by ethnic composition, etc.). Then randomly choose classrooms at each grade level within the school. Record the name of the teacher, the name of students in the class, and the grade level.

If the number of schools is so small that it is desired to survey all the schools, or if the school district should only have one junior high or high school, then, of course, no choice is present. Also, if the school should have only one class at any particular grade level, then again, no choice is indicated.

If the situation is such that the children attend more than one class per day and the teacher teaches more than one class per day, be sure to indicate in which particular class the survey is to be administered (e.g., Miss Doe's Fourth Period English Class).

Once the individual classes have been set, the design of the survey is complete and preparation of the survey kits can begin.

Assembling the Survey Kits

After all the necessary documents have been printed (See the previous section of this chapter), they are ready to be assembled into complete survey kits.

First, assemble the requisite number of teacher kits, as determined by the number of classrooms in the survey. In the large scale survey, we utilized 56 classrooms, requiring the formation of 56 teacher sets. Then prepare the parent survey kits for the K-3 grade levels and the student/parent survey kits for the 4-12 grade levels. Again, in the large-scale survey, we had each student rate objectives from one of three sets within his/her particular class. Thus, classes at the K-3 grade levels rated objectives from sets A, B, or C, classes at the 4-6 grade levels rated objectives from sets D, E, F, G, H, or J, and classes at the 7-12 grade levels rated objectives from sets M, N, or P. The number of parent or student/parent sets which will have to be prepared is, of course, determined by the number of classrooms in the survey, the grade levels covered, and the number of students in the individual classes.

When the teacher sets and the student/parent sets are complete, they are ready to be matched. In assembling the com-

plete kit, the following method was used to assure proper sampling. Let us assume we are assembling a kit for use at the ninth grade level. The teacher set would thus contain objective sets M, N, and P (either with or without sample test items if both are being used) and a response form for these sets of objectives. Then, assuming 36 students in the class, 12 student/parent sets containing objective set M would be assembled, 12 student/parent sets containing objective set N, and 12 student/parent sets containing objective set P would also be assembled. These would be identical to the objective sets which the teacher set contained. These would then be collated such that a student/parent set containing objective set M would be followed by a student/parent set containing objective set N, followed by one containing objective set P and then begin with set M again. Thus the pattern would be M, N, P, M, N, P...until all 36 student/parent sets were utilized. Then each set is numbered, beginning with 1 and continuing through 36 and a W or W/O is placed on each response form to indicate whether the objectives had sample test items (W) or not (W/O). Since the teacher instructions indicate that the survey sets are to be passed out in numerical order, this assures that, in each classroom, all the objective sets will be sampled.

The teacher set is then placed on top of the student/parent sets. The pre-letters, sufficient in number to enable each student to receive a copy, are placed in a manila envelope on which is printed a large letter "A". The manila envelope along with the teacher survey set, the student/parent survey sets, and the return envelope are all placed in a single large manila envelope. This large manila envelope is then addressed to the teacher. Also, on the outside of the large manila envelope is placed a series of instructions similar to the example below.

TO THE TEACHER:

1. Open envelope and remove small manila envelope "A".

2. Administer the survey to your Fourth Period English Class. Distribute contents of envelope A to students on Monday, (May 24). Have student read sheet, then take home to parents.

3. Read letter to Teachers prior to Wednesday (May 26).

If you have questions, contact Pupil Personnel (Ex. 237)

This series of instructions gives the specific dates on which the materials are to be distributed. In the cases where the teacher has more than one class, this series of instructions should specify which class is to receive the survey.

The survey kit for one class is now complete. This must be duplicated as many times as there are classes in the survey. Thus, our large-scale survey required 56 kits. The kits were then bundled together by school and taken to the central distribution point.

Announcements in the Teachers' Bulletin

To help assure proper timing of the survey and to prepare the teachers for the survey, announcements were placed in the Teachers' Bulletin, which was distributed daily by the district office. The first announcement was placed two days prior to the distribution of the survey kits. It said:

> The Instructional Objectives Exchange, in conjunction with the XYZ Unified School District, will be conducting a survey of students, parents, and teachers. On Monday and Tuesday, several randomly-selected teachers will receive a package of materials for distribution. Full instructions will accompany the materials.

This announcement was designed to prepare the teachers to be looking for the survey kits in their mail and to inform all teachers as to the events which were occurring.

On the Monday following the first announcement, the following announcement was placed in the Teachers' Bulletin:

> The following teachers were randomly selected to receive the Instructional Objectives Exchange survey kits.
>
> (List of teachers arranged by schools)
>
> If your name appears on this list and you do not receive a survey kit by tomorrow's mail, please contact:
>
> Pupil Personnel, Ext. 237

On the following Wednesday, the following announcement appeared:

> TO ALL TEACHERS PARTICIPATING IN THE IOX SURVEY:
>
> Please administer the survey to your designated class and have the students take home the survey sets to be completed by one of his/her parents.

This was followed by an announcement the next day, Thursday, stating:

> TO ALL TEACHERS PARTICIPATING IN THE IOX SURVEY:
>
> Please remind your students that the parent response forms must be returned by tomorrow, Friday, May 28.

The final announcement appeared on Friday and said:

> TO ALL TEACHERS PARTICIPATING IN THE IOX SURVEY:
>
> Please remind your students to hand in their parent response forms. After you have collected all of them, please place the following items in the stamped, addressed return envelope:
>
> 1. All your Student Response Forms (Pink Sheets)
> 2. All your Parent Response Forms (Yellow Sheets)
> 3. The Teacher Response Form (Green Sheets)
> 4. The Yellow Order Card marked with your complimentary selection and your name and school address
>
> Please do not return the objective lists and directions or any leftover sets.
>
> Thank you very much for your cooperation in administering this survey.

Discussions with teachers after the survey was completed seemed to indicate that these announcements did a very effective job in maintaining the timing of the survey. Several teachers indicated that the announcements enabled them to "stay on top of the events as they were supposed to happen."

Approximately four days after the survey was completed, the first return envelope was received at the IOX office. The envelopes continued to be received for approximately 30 days with the bulk of them being received between the seventh and fourteenth days.

Follow-up Letters

Twenty days after the completion of the survey it was found that ten teachers had failed to mail back the completed package. In an attempt to determine why this had occurred, a follow-up letter was prepared (See Example 20). Enclosed with the letter was a stamped, addressed return envelope. The letter was designed to be simple to answer, requiring only a check mark, and easy to return. This letter resulted

in the return of five additional completed packages, leaving only five unaccounted for. These same five teachers also did not return the follow-up letter indicating their failure for returning the completed package.

Of the forty-six teachers who did return the completed package prior to the sending of the above-mentioned follow-up letter, twelve teachers failed to return the Yellow Order Card marked with their complimentary collection. Working under the assumption that some of these teachers might have failed to receive an Order Card, or that some might have been misplaced, another follow-up letter was sent to these teachers along with another Order Card (See Example 22). At the time of the writing of this report, six of these teachers have returned the order card marked with their selection.

A final follow-up letter (See Example 23) was sent along with complimentary IOX collections. The purpose of this letter was to thank the teachers for their cooperation and to encourage them to send back their comments on the collection which they received.

The follow-up letters represent an end to the survey. From this point on, analysis of the data takes over as the area of prime concern. This is covered in the next section of this chapter.

A time schedule of events appears on the next page. The day sequence refers to weekdays only and excludes weekend days. The times shown are approximations only, since surveys of different sizes will require different lead times as far as printing, assembling, and distribution. The times shown are representative of these experienced by the IOX staff in conducting the large-scale survey in May, 1971.

TIME SCHEDULE

Initial Contact with School District	Day 1
Setting Up Survey	Day 2
Forming Survey Kits	Days 3-7
First Announcement in Teachers' Bulletin	Will depend upon no. of objs., no. of classrooms, etc.
Survey Kits to School Districts	Days 8-9
Second Announcement in Teachers' Bulletin	
Distribution of Pre-Letter	Day 10
Distribution of Survey Sets	Day 11
Administration in Classroom Parents Sets Home to Parents	
Third Announcement in Teachers' Bulletin	
Parents Complete Their Part of Survey	Day 12
Fourth Announcement in Teachers' Bulletin	
Parents Return Completed Response Forms	Day 13
Fifth Announcement in Teachers' Bulletin	
Teachers Mail Completed Survey	
Completed Survey Kits Received at IOX Office	Days 14-35

THE INSTRUCTIONAL OBJECTIVES EXCHANGE
Box 24095 Los Angeles, California 90024

Dear Teacher:

We at IOX thank you for your cooperation in helping to administer the Objective Rating Survey. Preliminary analysis of the data is already providing us with important information for the revision of our objective collections.

We also thank you, the parents, and the students for the many comments and suggestions. They also have provided us with valuable information, both about the objectives and the survey.

Our records indicate that you did not request a complimentary collection of IOX objectives. Just in case your order form was lost or misplaced, we have enclosed another for your use. Just fill in the necessary information and we will send your free copy immediately.

Sincerely,

IOX Research and Development Staff

HSM/bb

A Non-profit Educational Corporation

THE INSTRUCTIONAL OBJECTIVES EXCHANGE
Box 24095 Los Angeles, California 90024

Dear Teacher:

We have had a phenomenal response to our Objective Rating Survey. But as of this time there are still a few survey kits which have not been returned. We are attempting to account for the missing kits. Please check one of the boxes below to indicate the status of your survey kit. If you have not returned your response forms as of this time, please do so immediately so that we may begin analysis of the data.

CHECK ONE BOX Teacher's Name:_____

☐ I did not receive a survey kit.

☐ I received a survey kit but did not administer the survey.

☐ I administered the survey, but have not returned it to you.

☐ I administered the survey and returned it to you.

☐ Other: please comment on back of this letter.

Sincerely,

IOX Research and Development Staff

HSM/bg

A Non-profit Educational Corporation

APPENDIX C

READING OBJECTIVES

STUDY SKILLS -- LOWER ELEMENTARY

(Kindergarten through Third Grades)

OBJECTIVE A1: Given a book whose pages turn horizontally, the student will hold the book comfortably and turn each page from its upper right hand corner with the fingers of his right hand.

OBJECTIVE A2: Given a dictionary and a list of six words, the student will locate their definitions and write a sentence using each word.

OBJECTIVE A3: Given any pattern, the student will complete the pattern in a left to right progression.

OBJECTIVE A4: Given an oral direction, the student will repeat it.

OBJECTIVE A5: Given a book containing a table of contents, the student will demonstrate familiarity with the types of information it contains by answering questions on its content.

OBJECTIVE A6: Given three part directions orally by the teacher, the student will repeat the directions and carry out its instructions.

OBJECTIVE A7: Given a set of scrambled visual material, the student will arrange the material in sequential order.

OBJECTIVE A8: Given a book containing a table of contents, the student will state the types of information it contains.

OBJECTIVE A9: Given a selection for recreational reading, the student will demonstrate adjustment of his reading rate for rapid comprehension of its content by listing the main ideas within a specific time limit.

OBJECTIVE A10: Given a series of scrambled sentences, the student will arrange them in a sequential order.

This completes your list of objectives.

READING OBJECTIVES
STUDY SKILLS -- LOWER ELEMENTARY

(Kindergarten through Third Grades)

OBJECTIVE B1: Given the outline of a figure superimposed upon that of a square, the student will trace the outline of the figure with a pencil or crayon.

OBJECTIVE B2: Given reading material of suitable difficulty and length, the student will state its main ideas, facts or concepts.

OBJECTIVE B3: Given any short oral command, the student will follow its directions immediately.

OBJECTIVE B4: Given an instruction to trace a line, the student will trace it from left to right.

OBJECTIVE B5: Given the assignment of drawing a map of the block and cross streets on which his home is located, the student will organize his layout with a North-South-East-West orientation, mark the position of his house, and name the streets.

OBJECTIVE B6: Given four, scrambled pictures which illustrate a sequence of events when place in proper order, the student will rearrange the pictures in order from left to right.

OBJECTIVE B7: Given a selection of graded library books over a three month period, the student will demonstrate self-confidence in his reading ability by choosing, of his own volition during free-reading time, selections which are within five months of his established reading level.

OBJECTIVE B8: Given an illustration, the student will answer a question whose response is implied within the picture.

OBJECTIVE B9: Given a set of scrambled letters from a segment of the alphabet, the student will arrange them in alphabetical order.

OBJECTIVE B10: Given several large envelopes bearing labels and/or indicative pictures and a set of illustrations, the student will classify the illustrations by placing them in the proper envelopes.

This completes your list of objectives.

READING OBJECTIVES

STUDY SKILLS -- LOWER ELEMENTARY

(Kindergarten through Third Grades)

OBJECTIVE C1: Given a lined chart of written material, the student will orally read any specific line from left to right.

OBJECTIVE C2: Given several graded paragraphs and a group of titles, the student will match each paragraph with its appropriate title.

OBJECTIVE C3: Given a group of words with a variety of initial letters, the student will arrange them in alphabetical order.

OBJECTIVE C4: Given a set of commands, the student will follow these directions in proper sequence.

OBJECTIVE C5: Given a reader, the student will demonstrate his ability to use its table of contents by identifying on which pages a specific story begins and ends.

OBJECTIVE C6: The student will read silently without moving his lips.

OBJECTIVE C7: The student will correctly check a book out of the school library by completing its library book card.

OBJECTIVE C8: The student will demonstrate his mastery of eye-hand coordination by cutting a given figure out of paper with scissors, staying within an 1/8 inch of either side of the outline.

OBJECTIVE C9: Given two headings and a list of items, the student will classify each one under its proper categorial heading.

OBJECTIVE C10: Given the task of naming a group of objects arranged in a row, the student will name the objects in order moving from left to right.

This completes your list of objectives.

READING OBJECTIVES

STUDY SKILLS -- UPPER ELEMENTARY

(Fourth Grade through Sixth Grade)

OBJECTIVE D1: Given any graph, the student will identify the type and state its meaning.

OBJECTIVE D2: Given a dictionary and several sentences containing the same multi-meaning word in different contexts, the student will use the dictionary to identify the meaning of the word as used in each sentence.

OBJECTIVE D3: Given any diagram, the student will interpret the information given by answering specific questions on its content.

OBJECTIVE D4: Given several headings and a group of items, the student will classify them according to the categorical headings.

OBJECTIVE D5: Given a list of words characterized by possessing several meanings dependent upon pronunciation, the student will pronounce each word in such a way that all of the possible meanings are revealed.

OBJECTIVE D6: Given a textbook and a list of words found within its glossary, the student will locate the glossary and list the definition it gives for each word.

OBJECTIVE D7: Given a list of topics, the student will identify their number of placement in any library according to the Dewey Decimal System.

OBJECTIVE D8: Given facts of information pertaining to one subject, the student will organize them by writing a short summary of their content.

This completes your list of objectives.

READING OBJECTIVES
STUDY SKILLS -- UPPER ELEMENTARY

(Fourth Grade through Sixth Grade)

OBJECTIVE E1: Given a group of words, including several that have the same initial letter, the student will arrange them in alphabetical order.

OBJECTIVE E2: Given a set of encyclopedias and a list of topics, the student will locate each topic in the encyclopedia by using its alphabetical listing or volume number on the cover.

OBJECTIVE E3: Given a map and an incomplete information chart, the student will interpret the map by supplying the missing information required in the chart.

OBJECTIVE E4: Given a random list of words whose first two letters are the same, the student will arrange them in alphabetical order.

OBJECTIVE E5: Given a table of contents of a reading text, the student will demonstrate his comprehension of its organization by identifying the unit title of each section.

OBJECTIVE E6: Given a map and a picture of the same geographical area, the student will compare these two means of graphic representation by listing their similarities and differences.

OBJECTIVE E7: Given a book, the student will write its identifying characteristics in correct bibliographical form.

OBJECTIVE E8: Given any daily newspaper, the student will state its major purpose.

OBJECTIVE E9: Given an untitled selection, the student will compose a title appropriate for its content.

This completes your list of objectives.

READING OBJECTIVES

STUDY SKILLS -- UPPER ELEMENTARY

(Fourth Grade through Sixth Grade)

OBJECTIVE F1: Given any daily newspaper, the student will identify its major sections.

OBJECTIVE F2: Given a textbook, the student will use its index to locate specific information within the book.

OBJECTIVE F3: Given a scrambled list of common diacritical markings and their names, the student will match each marking with its name and provide a sample word to illustrate each sound.

OBJECTIVE F4: Given a map, the student will use its legend and key to identify any factual information it contains.

OBJECTIVE F5: Given an article, the student will outline in topic form its main points.

OBJECTIVE F6: Given appropriate information about a specific geographic area, the student will construct a model of the area in papier-maché.

OBJECTIVE F7: Given a specific topic, the student will locate the information in any encyclopedia and identify the guide words for the topic.

OBJECTIVE F8: Given a list of books and a card catelogue, the student will identify the type of card upon which each book is listed in the card catalogue of the library.

OBJECTIVE F9: Given a newspaper index, the student will locate specific information in it.

This completes your list of objectives.

READING OBJECTIVES

STUDY SKILLS -- UPPER ELEMENTARY

(Fourth Grade through Sixth Grade)

OBJECTIVE G1: Given a graded story to read, the student will summarize its main ideas in three paragraphs of at least four sentences each.

OBJECTIVE G2: Given a mixed group of words, pictures, facts, ideas, or events, the student will organize the groups by classifying its members into logical sub-groups.

OBJECTIVE G3: Given several topics and the Reader's Guide to Periodical Literature, the student will locate at least two sources of information for each topic.

OBJECTIVE G4: Given a reading selection of factual material, the student will identify its key words which may be used to locate additional information in any encyclopedia.

OBJECTIVE G5: Given a topic and several book titles, the student will identify the one(s) whose contents would cover the topic.

OBJECTIVE G6: Given any diagram with an incomplete information chart, the student will interpret the diagram by completing the missing information on the chart.

OBJECTIVE G7: Given orally a four-step direction calling for physical movement the student will follow the directions in correct order.

OBJECTIVE G8: Given an encyclopedia index, the student will locate specific topics with it.

OBJECTIVE G9: Given any graph, the student will interpret its information by answering questions on comparisons between specific portions of its content

This completes your list of objectives.

READING OBJECTIVES

STUDY SKILLS -- UPPER ELEMENTARY

(Fourth Grade through Sixth Grade)

OBJECTIVE H1: Given a short paragraph in which the important words of the main thoughts and details are underlined, the student will combine them by writing a one-sentence summary.

OBJECTIVE H2: Given a random list of words which contain the same first letter, the student will arrange the words in alphabetical order.

OBJECTIVE H3: Given any daily newspaper, the student will list the purposes of the classified ads section.

OBJECTIVE H4: Given a telephone directory, the student will locate specific information within it.

OBJECTIVE H5: Given a reading selection, the student will quickly determine its general ideas, by adjusting his reading rate to skim the material within a time limit.

OBJECTIVE H6: Given a list of books, the student will locate each one in the card catalogue of his school library.

OBJECTIVE H7: Given a book with a title page, the student will locate that page and answer questions on the information it provides.

OBJECTIVE H8: Given a bibliographic item, the student will interpret its information by answering specific questions on its content and format.

This completes your list of objectives.

READING OBJECTIVES
STUDY SKILLS -- UPPER ELEMENTARY

(Fourth Grade through Sixth Grade)

OBJECTIVE J1: Given a textbook, the student will locate specific information listed within its table of contents.

OBJECTIVE J2: Given any daily newspaper and a school textbook of factual material, the student will list their similarities and differences in writing style.

OBJECTIVE J3: Given a story, the student will write a summary identifying its main thoughts, facts or concepts.

OBJECTIVE J4: Given a list of the most common diacritical markings and their names, the student will list a sample word to illustrate the sound of each one.

OBJECTIVE J5: Given a dictionary and a group of words, the student will identify in which quarter of the dictionary each word is located.

OBJECTIVE J6: Given a dictionary and a list of words, the student will locate each word and identify what its grammatical abbreviation represents.

OBJECTIVE J7: Given a time schedule, the student will interpret its contents by completing an information table.

OBJECTIVE J8: Given a globe, the student will interpret its configurations by answering specific questions on its content.

OBJECTIVE J9: Given a list of words, the student will identify the dictionary guide words for each.

This completes your list of objectives.

READING OBJECTIVES
STUDY SKILLS -- SECONDARY LEVEL

(Seventh Grade through Twelfth Grade)

OBJECTIVE M1: Given the table of contents in a textbook the student will locate the chapter in which a specific topic can be found.

OBJECTIVE M2: Given a reading passage, the student will divide it into sections appropriate to its content and give each section a subtitle.

OBJECTIVE M3: The student will demonstrate speed and accuracy in his use of guide words at the top of each page in the dictionary by locating a list of words within a given time limit and reporting the page number of each, along with its guide words.

OBJECTIVE M4: Given any diagram and a set of related multiple choice questions, the student will read the diagram and answer the questions based upon it.

OBJECTIVE M5: The student will alphabetize lists of words, each of which begins with two or more of the same letters.

OBJECTIVE M6: Given the name of a resource material, the student will identify the specific purposes for which it can be used.

OBJECTIVE M7: Given a story to skim, the student will identify its main divisions.

OBJECTIVE M8: Given an index and a specific topic, the student will identify under which heading in the index the topic would most logically be located.

This completes your list of objectives.

READING OBJECTIVES

STUDY SKILLS -- SECONDARY LEVEL

(Seventh Grade through Twelfth Grade)

OBJECTIVE N1: Given a series of related paragraphs, the student will summarize their content by making an outline.

OBJECTIVE N2: Given a factual report the student will make a simple outline of its content.

OBJECTIVE N3: The student will alphabetize a list of words each of which begins with the same letter.

OBJECTIVE N4: Given a set of statistics, the student will construct a chart, map or graph, as directed.

OBJECTIVE N5: The student will demonstrate his understanding of diacritical markings in the dictionary by explaining those found for a given set of words.

OBJECTIVE N6: Given a selection containing 400 to 500 words, and a list of short questions on its content, the student will read the selection within a specified time limit and answer the questions.

OBJECTIVE N7: Given a list of questions on the contents of a specific textbook, the student will demonstrate his ability to use the parts of a text by answering each question.

OBJECTIVE N8: Given a series of supporting ideas, the student will supply a heading appropriate to their content.

This completes your list of objectives.

READING OBJECTIVES

STUDY SKILLS -- SECONDARY LEVEL

(Seventh Grade through Twelfth Grade)

OBJECTIVE P1: Given a list of book titles, the student will identify the subject matter and classification number according to the Dewey decimal system of each one.

OBJECTIVE P2: The student will alphabetize a list of words, each of which begins with a different letter.

OBJECTIVE P3: Given a report, the student will summarize its content.

OBJECTIVE P4: Given a topographical map with an elevation scale, and a list of geographic locations, the student will identify the approximate altitude above sea level for each location.

OBJECTIVE P5: Given a list of library references and a set of short, descriptive topics, the student will identify the reference source for each topic.

OBJECTIVE P6: Given a series of related paragraphs, the student will summarize their main ideas or topic sentences by writing a set of short notes.

OBJECTIVE P7: Given a list of library resource materials and a set of specific items of information, the student will identify the appropriate source for each item of information.

OBJECTIVE P8: Given a set of sentences, each missing a word, and two phonetic spellings for the missing word, the student will identify the correct phonetic spelling of the word omitted in each sentence.

OBJECTIVE P9: Given a factual article, the student will outline its content and provide a title derived from the main idea.

This completes your list of objectives.

APPENDIX D

READING OBJECTIVES

STUDY SKILLS -- LOWER ELEMENTARY

(Kindergarten through Third Grades)

OBJECTIVE A1: Given a book whose pages turn horizontally, the student will hold the book comfortably and turn each page from its upper right hand corner with the fingers of his right hand.

SAMPLE ITEM: Self-evident

OBJECTIVE A2: Given a dictionary and a list of six words, the student will locate their definitions and write a sentence using each word.

SAMPLE ITEM: Locate the following words in your dictionary. Write a sentence using each one correctly.

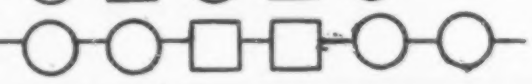
1. yard
2. over
3. beautiful
4. station
5. feather
6. told

ANSWER: Any sentences that use these words correctly are appropriate.

OBJECTIVE A3: Given any pattern, the student will complete the pattern in a left to right progression.

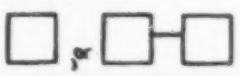
SAMPLE ITEM: Follow these patterns across the page from left to right and add the missing picture

1.

2. 

ANSWER:

1

2 

OBJECTIVE A4: Given an oral direction, the student will repeat it.

SAMPLE ITEM: Repeat the following directions to another student who has not heard them:

1. walk to the back of the room
2. raise your arms over your head
3. clap your hands once.

ANSWER: Self-evident

OBJECTIVE A5: Given a book containing a table of contents, the student will demonstrate familiarity with the types of information it contains by answering questions on its content.

SAMPLE ITEM: Read this table of contents. Then answer the questions below it.

PART ONE	
Too Big	Ruth Sawyer.....10
The Running Bear	Tom Petterson....14
The Clouds are Gone	Jim Fine.....20
New Girl in the Class	Charles Klein....25

Questions:

1. What is the title of the last story?
2. On what page does it begin?
3. Who wrote the story?
4. How many stories are listed in Part One?

ANSWER:

1. New Girl in the Class
2. page 25
3. Charles Klein
4. four stories

OBJECTIVE A6: Given three part directions orally by the teacher, the student will repeat the directions and carry out its instructions.

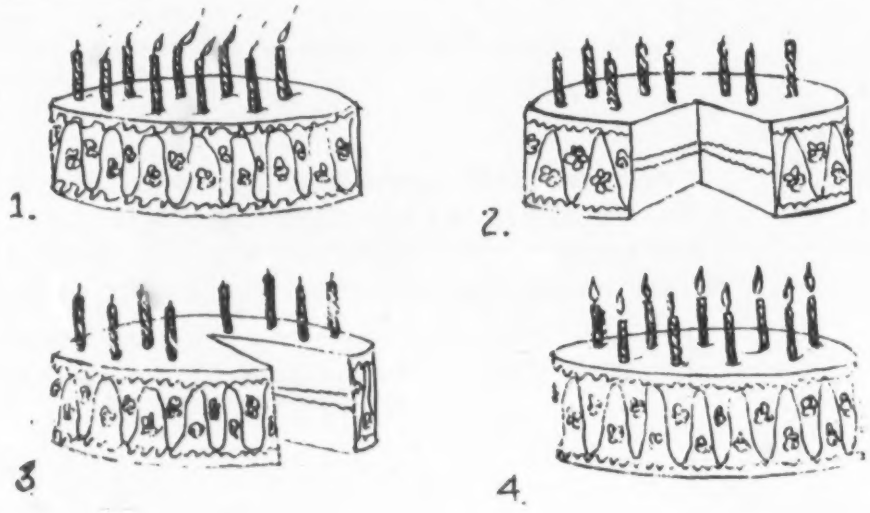
SAMPLE ITEM: Repeat all three directions and follow them.

1. Stand up.
2. Clap your hands twice.
3. Raise your right hand over your head.

ANSWER: Student repeats directions exactly and then follows them exactly.

OBJECTIVE A7: Given a set of scrambled visual material, the student will arrange the material in sequential order.

SAMPLE ITEM: Arrange these pictures in sequential order.



ANSWER: 4, 1, 3, 2

OBJECTIVE A8: Given a book containing a table of contents, the student will state the types of information it contains.

SAMPLE ITEM: State the types of information found in the table of contents in your reader.

ANSWERS:
1. Titles of stories.
2. Authors of stories.
3. The page number on which each story begins.

OBJECTIVE A9: Given a selection for recreational reading, the student will demonstrate adjustment of his reading rate for rapid comprehension of its content by listing the main ideas within a specific time limit.

SAMPLE ITEM:	Read this selection and list its main ideas within two minutes. Man covets sea turtles for their meat, oil, shells and particularly their eggs, and in recent years his harvest has been so thorough that the ancient reptiles have all but disappeared in many parts of the world. Though all five types are in jeopardy, the green sea turtle--prized by gourmets as the essence of turtle soup--is especially threatened.
ANSWER:	Man uses sea turtles for their meat, oil, shells, and eggs. These reptiles have almost disappeared because of man. All five types are in danger of extinction, especially the green sea turtle.

OBJECTIVE A10: Given a series of scrambled sentences, the student will arrange them in a sequential order.

SAMPLE ITEM:	Arrange the following sentences in sequence by numbering them in the order they should appear. a. Tom carried the grocery bags into the kitchen. b. Tom's mother paid the clerk for their groceries. c. Tom put the canned goods on the cupboard shelf for his mother. d. He helped his mother select the groceries they needed in the store. e. Tom drove with his mother to the market. f. Tom helped his mother put their groceries into the car.
ANSWER:	a. 5 b. 4 c. 2 d. 6 e. 1 f. 3

This completes your list of objectives.

APPENDIX E

POSITION STATEMENT REGARDING THE CLASSROOM TEACHER SUPPORT SYSTEM*

"The Classroom Teacher Support System (CTSS) is designed to aid the teacher in preparing and scoring exercises." By an exercise is meant a collection of items which can be given to students as a test or assignment. The teacher "prepares" an exercise by selecting from among items, themselves chosen by the computer from a very large pool of items to conform to teacher-imposed specifications regarding subject matter, number of items, item difficulty level, cognitive level, and so forth. Once the teacher has decided which items to use, the computer can be made to print the exercise on "reproduction masters". These two steps can be combined into one if the teacher asks the computer to select exactly as many items as she intends to use. (If the computer provides an item the teacher does not like, she can have the item suppressed should she elect to have the computer score the tests.)

Some of the features of the CTSS include the following: (1) test scoring service including part scoring, (2) statistical data regarding the test performance of the class, (3) additional "versions" of the exercise in which items are reordered (presumably to cut down on cheating), (4) item editing capabilities, (5) both card and optically scanned input, and (6) a built-in flexibility for item classification schemes (the "X-Dimension").

Some constraints of the system are that: (1) it requires a large item pool, (2) the items must be multiple-choice (two to five options) having exactly one correct answer, (3) the program is tied to certain IBM hardware, and (4) the program is not designed to provide records on individual students and thus would not be an integral part of a computer-managed individual instructional system.

A prototype of the system has been in operation for about a year in the Los Angeles Unified School District. An 8,000 item pool in the subject field of history was constructed at an estimated cost of "approximately $40,000.00".

Although some instructions and forms are more complicated than need be, the CTSS appears to be carefully developed and contains many interesting options. In my view, the CTSS represents a first-class effort to help the classroom teacher construct and score test exercises. The applicability of this item retrieval and editing system to the goals of the Instructional Objectives Exchange will be considered next.

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*This position paper was prepared by Jason Millman.

One way of using the CTSS is to treat an instructional objective as an "item". This could be done. The output of the computer program would then be a list of objectives which met certain criteria regarding such dimensions as subject matter, age level, and so forth. The CTSS was not written with this use in mind. It is not surprising, therefore, to find the CTSS more complicated and less efficient than need be for this task. Given the task of retrieving objectives, it makes much more sense to use a classical computer retrieval system (see Chapter Six in this report) than to press the CTSS with its excess baggage into this service.

Consider now use of the CTSS as intended, by local teachers who want to construct exercises consisting of test items which satisfy certain criteria. In the typical situation, the teacher decides to give a test on some unit such as the civil war, and requests from the computer a listing of possible items. Such exercises are not criterion-referenced. The CTSS encourages the normative use of testing and normative (i.e., relative to the performance of other students) grading practices at the neglect of tailoring instruction to the ability of the individual to demonstrate mastery of instructional objectives.

This failing suggests that perhaps CTSS be used with criterion-referenced measures as the "exercises". This use is more in line with a goal of the Instructional Objectives Exchange to supply users with performance-based indicators of whether given objectives have been met. If an item-form is not available for an objective, then there will probably be too few items available to measure the objective to justify the need of a computer support retrieval system. Even if lots of items were available, there does not seem to be a retrieval problem. The potential items would obviously be grouped together under a given objective. One or more mastery tests for each objective could be preprinted for use by the teacher.

By way of summary, the CTSS is designed in part to retrieve items which teachers can use to test their students. These test items, however, would not be tied to specific objectives in a way in which the teacher could tell if these objectives have been mastered. Although the CTSS could be used in ways more compatible with the goals of the Instructional Objectives Exchange, such practice was not seen as an efficient use of computer capabilities.

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